ORIGINAL TO GENERAL FILES

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

OFFICE OF DESIGN POLICY & SUPPORT
INTERDEPARTMENTAL CORRESPONDENCE

FILE P.I. # 0013062
Gwinnett County
GDOT District 1 - Gainesville
SR 13 @ CS 1181/Pleasant Hill Road
Interchange Improvement

OFFICE Design Policy & Support

DATE November 16, 2016

FROM for Brent Story, State Design Policy Engineer

TO SEE DISTRIBUTION

SUBJECT **APPROVED CONCEPT REPORT**

Attached is the approved Concept Report for the above subject project.

Attachment

DISTRIBUTION:

Hiral Patel, Director of Engineering
Joe Carpenter, Director of P3/Program Delivery
Albert Shelby, State Program Delivery Engineer
Darryl VanMeter, State Innovative Delivery Engineer
Bobby Hilliard, Program Control Administrator
Cindy VanDyke, State Transportation Planning Administrator
Eric Duff, State Environmental Administrator
Andrew Heath, State Traffic Engineer
Angela Robinson, Financial Management Administrator
Lisa Myers, State Project Review Engineer
Monica Flournoy, State Materials and Testing Administrator
Patrick Allen, State Utilities Engineer
Richard Cobb, Statewide Location Bureau Chief
Brent Cook, District Engineer
Brandon Kirby, District Preconstruction Engineer
Robby Oliver, District Utilities Engineer
Robert Reid, Project Manager
BOARD MEMBER - 7th Congressional District

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
LIMITED SCOPE PROJECT CONCEPT REPORT

Project Type:	Intersection Improvement	P.I. Number:	0013062
GDOT District:	District 1	County:	Gwinnett
Federal Route Number:	US 23	State Route Number:	SR 13
	Project Number:	*ARC TIP: GW-392*	

Project Description: This project seeks to improve the conditions related to operations at the interchange between US 23/SR 13/Buford Highway and Pleasant Hill Road. Proposed improvements include functional and decorative landscaping, potentially addressing of the southbound on-ramp terminus to improve merge lane functioning, improving visibility and location of wayfinding signs, adding clarification striping and signage to prevent wrong-way travel on interchange ramps, and improving lighting elements for visibility.

▶ Report was updated to address Office Head comments

Submitted for approval:

Consultant Designer & Firm — Date: 10/28/16

Local Government Sponsor — Date: 10/24/16

for State Program Delivery Engineer — Date: 11/2/2016

GDOT Project Manager — Date: 10/24/16

Recommendation for approval:

■ Eric Duff/KLP — State Environmental Administrator — Date: 9-22-2016

Environmental Surveys for history & ecology are complete. *(Surveys are complete means that the field survey has been performed; at this point survey reports are just being submitted for review to the Office of Environmental Service)*

■ Christopher Raymond/KLP — For State Traffic Engineer — Date: 10-3-2016

■ Erik Rohde/KLP — for Project Review Engineer — Date: 9-29-2016

State Utilities Engineer — Date

District Engineer — Date

☒ MPO Area: This project is consistent with the MPO adopted Regional Transportation Plan (RTP)/Long Range Transportation Plan (LRTP).

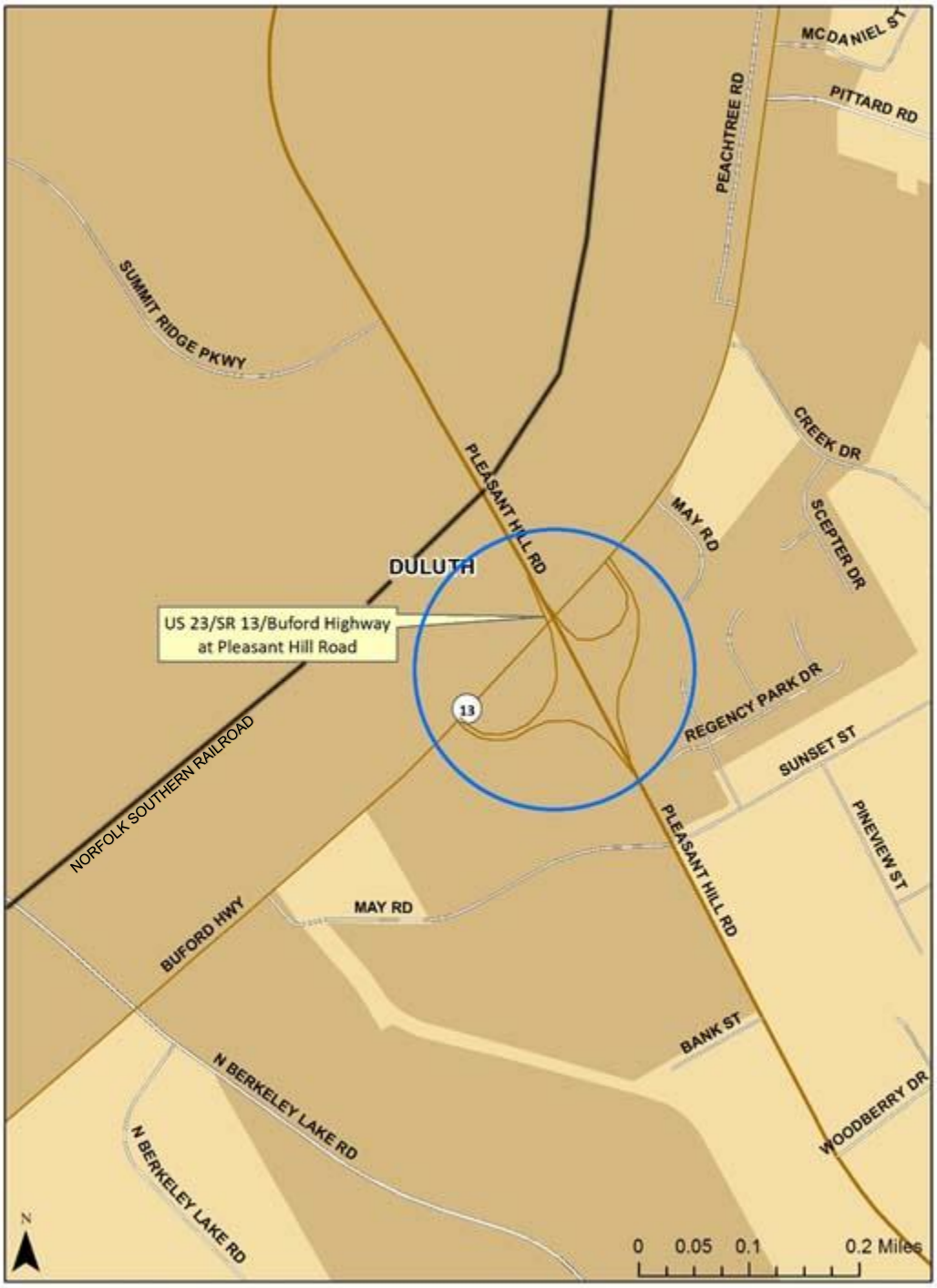
☐ Rural Area: This project is consistent with the goals outlined in the Statewide Transportation Plan (SWTP) and/or is included in the State Transportation Improvement Program (STIP).

■ Tom McQueen/KLP — For State Transportation Planning Administrator — Date: 9-22-2016

Approval:
Concur: Neal Petrol 11-9-16
GDOT Director of Engineering Date

Approve: Margaret B. Pukle 11.10.16
GDOT Chief Engineer Date

PROJECT LOCATION MAP



PLANNING AND BACKGROUND

Project Justification Statement: US 23/SR 13/Buford Highway and Pleasant Hill Road is a major interchange that links the City of Duluth to the cities of Norcross, Berkeley Lake, Peachtree Corners, and Johns Creek. With the increasing population growth in the northern part of Gwinnett County over the last twenty years, SR 13/Buford Highway and Pleasant Hill Road have become major transportation corridors for vehicles traveling to and from I-85.

With the increasing volume of vehicles using the interchange, some potential concerns have been identified for investigation and possible improvement, deficient visibility of wayfinding signs through the interchange, unclear routing for pedestrians through the interchange, unsignalized retail access at a signalized intersection on Buford Highway, and a lack of street lighting.

Existing conditions: The intersection of US 23/SR 13/Buford Highway and Pleasant Hill Road handles over 60,000 vehicles per day according to recent GDOT count stations in the vicinity of the interchange. The interchange is a partial clover-leaf design, with merge/diverge points on Pleasant Hill Road at ramp termini locations. These ramps lead to and from signalized intersections with SR 13/Buford Highway. The intersections are equipped with video detection and pedestrian enhancements like large refuge islands, push buttons and pedestrian signal heads.

SR 13/Buford Highway is aligned southwest to northeast and consists of a 4-lane typical section with a center two-way left turn lane. At the interchange, the center lane becomes auxiliary left turn lanes onto the ramps to Pleasant Hill Road. Buford Highway is part of the Regional Thoroughfare Network and is classified as a Minor Arterial. The posted speed limit is 45 mph.

Pleasant Hill Road is aligned southeast to northwest and consists of a 6-lane typical section separated by a raised concrete median approximately 20’ in width. Pleasant Hill Road is a part of the Regional Thoroughfare Network and is classified as a Principal Arterial. The posted speed limit is 45 mph.

Other projects in the area:
GDOT PI #0006823; Pleasant Hill Road Advanced Traffic Management System (ATMS) from US 23/Buford Highway to Fulton County Line
Install ITS devices (CCTV cameras, detector units, ITS comm., etc.) to monitor/detect incidents, improve signal operations, and detour management.

GDOT PI #0012883; Western Gwinnett Bikeway Extension
Install a 10’-12’ multi-use trail on N. Berkeley Lake Road from Peachtree Industrial Blvd. to US 23/Buford Highway.

GDOT PI #0012641; US 23/SR 13/Buford Highway Pedestrian Mobility Improvements
Install 5’ sidewalk on west side of SR 13 from Simpson Circle/North Berkeley Lake Road to South Berkeley Lake Road.

MPO: Atlanta Regional Commission (ARC) **TIP #:** *GW-392*

Congressional District(s): 7

Federal Oversight: ☐ PoDI ☒ Exempt ☐ State Funded ☐ Other

Projected Traffic: ADT 24 HR T: 4.3%
Current Year (2016): 54,800 Open Year (2019): 59,000 Design Year (2039): 72,000
Traffic Projections Performed by: *SEI Consulting*
Date Approved by GDOT Office of Planning: 8-3-16

Functional Classification (Mainline): Urban Principal Arterial

Complete Streets - Bicycle, Pedestrian, and/or Transit Standard Warrants:

Warrants met: ☐ None ☐ Bicycle ☒ Pedestrian ☐ Transit

A review of the site with respect to cyclists, pedestrians and transit riders indicates that the conditions on SR 13/Buford Highway and Pleasant Hill Road are satisfactory for pedestrians, and are not conducive for bicycle travel within the road due to Average Daily Traffic (ADT) numbers exceeding 30,000 vpd on both roads, unless buffered by striping and physical barriers.

The existing sidewalks and enhanced, visible crosswalks at the two signals on Buford Highway create the appropriate facility type for pedestrian traffic. Curb ramps at refuge islands are adequately designed as well.

This project also meets the bike warrant due to the close proximity of both residential neighborhoods and a school. This project is also in an area rated mid-level for walking and biking propensity in the ARC's 2015 Walk Bike Thrive plan (http.://www.atlantaregional.com/transportation/bicycle—pedestrian).

Due to the high volume of vehicular traffic using this interchange and the configuration of the roadway, bike facilities have not been included in this concept but were considered per the GDOT Complete Streets Policy.

There are no transit routes (Gwinnett County Transit) that pass through this interchange, making accommodation of transit riders unnecessary.

Pavement Evaluation and Recommendations

Preliminary Pavement Evaluation Summary Report Required? ☒ No ☐ Yes
Preliminary Pavement Type Selection Report Required? ☒ No ☐ Yes
Feasible Pavement Alternatives: ☒ HMA ☐ PCC ☐ HMA & PCC

DESIGN AND STRUCTURAL

Description of the proposed project: The interchange that is proposed for improvement is at the intersection of US 23/SR 13/Buford Highway and Pleasant Hill Road. The interchange is grade-separated and is designed as a partial cloverleaf. The interchange lies within the city limits of Duluth in Gwinnett County. A rail line to the northwest of the interchange (approximately 378' northwest of the Buford Highway bridge deck), and generally parallel to Buford Highway provides a constraint for improvements in that direction.

The proposed improvements will be limited to generally 500'-750' in advance of the two signalized intersections on Buford Highway, 750'-1000' in advance of the diverge point for the ramp from Pleasant Hill Road northbound, and 750'-1000' in advance of the diverge point for the ramp from Pleasant Hill Road southbound for the purposes of providing sufficient advance distance for wayfinding signs.

Proposed improvements to the interchange may include any or all of the following:

- The addition of street and potential pedestrian-scale lighting to increase visibility in low-light conditions. Lighting will be limited to Buford Highway as the project budget cannot accommodate lighting of the full interchange.
- Increasing the number, visibility, and forewarning distance of wayfinding signs.
- Installation of Raised Pavement Markings (RPMs) along turning guidance striping, around the median noses at both ramp termini on Buford Highway to increase visibility of obstacles.

- The addition of landscaping enhancements. This is a gateway to the City of Duluth and currently there is no landscaping in this area. The landscaping will be designed to signal the arrival to the City of Duluth while addressing utility restrictions, driver sight lines, billboard sight lines, and AASHTO clear zones. Minor grading adjustments may be included to current lawn areas. Plantings will consist of low maintenance native and adapted species and will consider groundcovers, grasses, shrubs and trees. The overall design will incorporate locations of areas for future artwork pieces or structures that may be included by the City of Duluth. Design may feature areas to discourage pedestrians from crossing at unmarked locations. Refer to Attached Concept showing areas for potential landscape enhancements.
- Sight distance calculations will be run and clear zones will be maintained for all proposed improvements.

Major Structures:

Structure	Existing	Proposed
US 23/SR 13/Buford Highway bridge: NBI #13552110	Approximately 265' long, 96' wide; typical section includes 4 lanes (12' wide), a SB left turn lane (12' wide), a NB left turn lane (12' wide), and a raised concrete median varying between 9' and 18'; sufficiency rating-85.9	No Change
Norfolk Southern railroad bridge	Approximately 140' long, 55' wide; bridge carries 2 dedicated rail lines	No Change
Retaining walls on east and west side of Pleasant Hill Road	Retaining walls exist on either side of Pleasant Hill Road for approximately 680'; approximate height of retaining walls is 30'-35'	No Change

Mainline Design Features: ***Pleasant Hill Road – Urban Principal Arterial***

Feature	Existing	Standard*	Proposed
Typical Section			
- **Number of Lanes**	**6**	**4 Lanes or Greater**	**6**
- **Lane Width(s)**	**12'**	**11'-12'**	**12'**
- **Median Width & Type**	**Raised Conc. 20'**	**Raised 20'**	**Raised Conc. 20'**
- **Outside Shoulder or Border Area Width**	**8'-12' (varies with retaining wall)**	**10'-16'**	**8'-12' (varies with retaining wall)**
- **Outside Shoulder Slope**	**2%**	**2%**	**2%**
- **Inside Shoulder Width**	**N/A**	**N/A**	**N/A**
- **Sidewalks**	**5' 6"**	**5'**	**5' 6"**
- **Auxiliary Lanes**	**12'**	**11'-12'**	**12'**
- **Bike Lanes**	**N/A**	**4'**	**N/A**
Posted Speed	**45**		**45**
Design Speed	**45**	**45**	**45**
Min Horizontal Curve Radius	**22,918.18'**	**730'**	**22,918.18'**
Maximum Superelevation Rate	**N/A**	**4%**	**N/A**
Maximum Grade	**4.9%**	**7%**	**4.9%**
Access Control	**Permitted access**	**Permitted access**	**Permitted access**
Design Vehicle			
Pavement Type			

*According to current GDOT design policy if applicable

Cross Street Design Features: ***Buford Highway – Urban Minor Arterial***

Feature	Existing	Standard*	Proposed
Typical Section			
- **Number of Lanes**	**4**	**4 Lanes**	**4**
- **Lane Width(s)**	**12'**	**11'-12'**	**12'**
- **Median Width & Type**	**Raised Conc. 16' (on approach to bridge deck)**	**Raised 20'**	**Raised Conc. 16' (on approach to bridge deck)**
- **Outside Shoulder or Border Area Width**	**12'**	**10'-16'**	**12'**
- **Outside Shoulder Slope**	**2%**	**2%**	**2%**
- **Inside Shoulder Width**	**N/A**	**N/A**	**N/A**
- **Sidewalks**	**5' 6"**	**5'**	**5' 6"**
- **Auxiliary Lanes**	**12'**	**11'-12'**	**12'**
- **Bike Lanes**	**N/A**	**4'**	**N/A**
Posted Speed	**45**		**45**
Design Speed	**45**	**45**	**45**
Min Horizontal Curve Radius	**2277.62'**	**730'**	**2277.62'**
Maximum Superelevation Rate	**8%**	**4%**	**8%**
Maximum Grade	**2.1%**	**7%**	**2.1%**
Access Control	**Permitted access**	**Permitted access**	**Permitted access**
Design Vehicle			
Pavement Type			

*According to current GDOT design policy if applicable

Major Interchanges/Intersections: The proposed project involves improvements at the grade-separated interchange between Pleasant Hill Road and US 23/SR 13/Buford Highway in order to reduce the likelihood and severity of crashes and reduce driver confusion. Ramp termini on Pleasant Hill Road are unsignalized merge/diverge points that transition to ramps that terminate at two at-grade signalized intersections on Buford Highway.

Adjacent intersections in proximity to this interchange that could potentially be impacted are located at:
- Pleasant Hill Road at Summit Ridge Parkway (1,430' northwest of Pleasant Hill Road ramp termini)
- Pleasant Hill Road at May Road (500' southeast of Pleasant Hill Road ramp termini)

Lighting required: ☐ No ☒ Yes

Off-site Detours Anticipated: ☒ No ☐ Yes ☐ Undetermined

Transportation Management Plan [TMP] Required: ☐ No ☒ Yes
If Yes: Project classified as: ☒ Non-Significant ☐ Significant
TMP Components Anticipated: ☒ TTC ☐ TO ☐ PI

Design Exceptions to FHWA/AASHTO controlling criteria anticipated:

FHWA/AASHTO Controlling Criteria	No	Undeter-mined	Yes	Appvl Date (if applicable)
1. Design Speed	☒	☐	☐	
2. Lane Width	☒	☐	☐	
3. Shoulder Width	☒	☐	☐	
4. Bridge Width	☒	☐	☐	
5. Horizontal Alignment	☒	☐	☐	
6. Superelevation	☒	☐	☐	
7. Vertical Alignment	☒	☐	☐	
8. Grade	☒	☐	☐	
9. Stopping Sight Distance	☒	☐	☐	
10. Cross Slope	☒	☐	☐	
11. Vertical Clearance	☒	☐	☐	
12. Lateral Offset to Obstruction	☒	☐	☐	
13. Bridge Structural Capacity	☒	☐	☐	

.

Design Variances to GDOT Standard Criteria anticipated:

GDOT Standard Criteria	Reviewing Office	No	Undeter--mined	Yes	Appvl Date (if applicable)
1. Access Control/Median Openings	DP&S	☒	☐	☐	
2. Intersection Sight Distance	DP&S	☒	☐	☐	
3. Intersection Skew Angle	DP&S	☒	☐	☐	
4. Lateral Offset to Obstruction	DP&S	☒	☐	☐	
5. Rumble Strips	DP&S	☒	☐	☐	
6. Safety Edge	DP&S	☒	☐	☐	
7. Median Usage	DP&S	☒	☐	☐	
8. Roundabout Illumination Levels	DP&S	☒	☐	☐	
9. Complete Streets	DP&S	☒	☐	☐	
10. ADA & PROWAG	DP&S	☒	☐	☐	
11. GDOT Construction Standards	DP&S	☐	☒	☐	
12. GDOT Drainage Manual	DP&S	☒	☐	☐	
13. GDOT Bridge & Structural Manual	Bridges	☒	☐	☐	

VE Study anticipated: ☒ No ☐ Yes ☐ Completed – Date:

UTILITY AND PROPERTY

Railroad Involvement: Norfolk Southern (NS) Railroad owns and operates the tracks that cross at the grade-separated crossing to the northwest of the interchange. Coordination is the responsibility of the City of Duluth and will take place to inform NS of the project because it is within the nearby vicinity of the proposed improvements, but no impacts to the rail lines are anticipated. Plan sets will be provided for review.

Utility Involvements:

Utility Type	Owner
Electric/Power	Georgia Power
Electric/Power	Georgia Power Transmission
Gas	Atlanta Gas Light
Water	Gwinnett County
Sewer	Gwinnett County
Telephone	Bellsouth
Cable/TV	Comcast
Other	Quest Communications
Railroad	Norfolk Southern

SUE Required: ☒ No ☐ Yes ☐ Undetermined

Public Interest Determination Policy and Procedure recommended? ☒ No ☐ Yes

Right-of-Way (ROW): Existing width: 115 (varies) ft. Proposed width: 115 (varies) ft.
Required Right-of-Way anticipated: ☒ None ☐ Yes ☐ Undetermined
Easements anticipated: ☒ None ☐ Temporary ☐ Permanent ☐ Utility ☐ Other

Anticipated total number of impacted parcels: 0
Displacements anticipated: Businesses: 0
Residences: 0
Other: 0
Total Displacements: 0

Location and Design approval: ☒ Not Required ☐ Required

CONTEXT SENSITIVE SOLUTIONS

Issues of Concern: The area is a gateway to the City of Duluth and currently there is no landscaping in this area. Wayfinding between the historic downtown area and I-85 is currently difficult to see and leads to driver confusion.

Context Sensitive Solutions Proposed: The landscaping will be designed to signal the arrival to the City of Duluth while addressing utility restrictions, driver sight lines, billboard sight lines, and AASHTO clear zones. Minor grading adjustments may be included to current lawn areas. Plantings will consist of low maintenance native and adapted species and will consider groundcovers, grasses, shrubs and trees. The overall design will incorporate locations of areas for future artwork pieces or structures that may be included by the City of Duluth. Design may feature areas to discourage pedestrians from crossing at unmarked locations. Refer to Attached Concept showing areas for potential landscape enhancements.

ENVIRONMENTAL & PERMITS

Anticipated Environmental Document:
NEPA: ☐ PCE ☒ CE ☐ EA-FONSI ☐ EIS

GEPA: ☐ Type A ☐ Type B ☐ EER ☒ NONE

Level of Environmental Analysis:
☐ The environmental considerations noted below are based on preliminary desktop or screening level environmental analysis and are subject to revision after the completion of resource identification, delineation and agency concurrence.

☒ The environmental considerations noted below are based on the completion of resource identification, delineation and agency concurrence.

MS4 Compliance – Is the project located in a MS4 area? ☐ No ☒ Yes

Is there a Project Level Exclusion that applies to this project: ☐ No ☒ Yes
If yes, please indicate which of the following exclusions apply:

☐ Roadways that are not owned or operated (maintained) by GDOT may not require post-construction BMPs. Coordinate with the appropriate local government or entity to determine stormwater management requirements.

☐ The project location is not within a designated MS4 area.

☐ Maintenance and safety improvement projects whereby the sites are not connected and disturbs less than one acre at each individual site. This includes projects such as repaving, shoulder building, fiber optic line installation, sign addition, and sound barrier installation.

☐ Projects that have their environmental documents approved or right-of-way plans submitted for approval on or before June 30th, 2012.

☒ Road projects that disturb less than 1 acre or for site development projects that add less than 5,000 ft^2 of impervious area.

Is Protected Species water quality mitigation anticipated? ☒ No ☐ Yes .

Environmental Permits/Variances/Commitments/Coordination anticipated:

Permit/ Variance/ Commitment/ Coordination Anticipated	No	Yes	Remarks
1. U.S. Coast Guard Permit	☒	☐	
2. Forest Service/Corps Land	☒	☐	
3. CWA Section 404 Permit	☒	☐	
4. Tennessee Valley Authority Permit	☒	☐	
5. Buffer Variance	☒	☐	
6. Coastal Zone Management Coordination	☒	☐	
7. NPDES	☐	☒	If disturbance area exceeds 1 acre, NPDES will be implemented.
8. FEMA	☒	☐	
9. Cemetery Permit	☒	☐	
10. Other Permits	☒	☐	
11. Other Commitments	☒	☐	
12. Other Coordination	☒	☐	

Is a PAR required? ☒ No ☐ Yes ☐ Completed – Date:

Environmental Comments and Information:

NEPA/GEPA: This project is expected to quality for a CE level class of action. Work on the CE has not yet begun. Special studies are underway. No significant issues or 4(f) involvement is anticipated.

Ecology: An Ecological Resources Survey and Assessment of Effects (ERS-AOER) combined report is being drafted. Fieldwork has been completed and one non-buffered state water and one intermittent stream were identified near to but outside the project limits. No impacts are anticipated. No significant ecological issues are anticipated. No impacts to protected species, protected species habitat, migratory birds, bats, waters of the US, state waters, or state water buffers are anticipated.

History: No historic resources were identified within the project area of potential effect (APE). A No Historic Properties Affected memo is expected to be the required level of documentation.

Archeology: A Phase I archaeological survey was completed for the project area. No archaeological resourced were identified during the survey or background research. A short form for negative finding is the anticipated level of documentation.

Air Quality:

Is the project located in a PM 2.5 Non-attainment area? ☐ No ☒ Yes
Is the project located in an Ozone Non-attainment area? ☐ No ☒ Yes
Carbon Monoxide hotspot analysis: ☐ Required ☒ Not Required ☐ TBD
The proposed project is not anticipated to be a project of air quality concern for PM 2.5 or Ozone.

The 2039 ADT is 73,370. The segment planning LOS based on daily volume is F. However, the signalized intersections are operating at LOS C or better during the weekday peak hours

This project will not increase capacity and is not expected to increase emissions current levels.

Noise Effects: The proposed project is expected to qualify for a noise screening assessment as a Type III project. Type III projects do not require the preparation of a noise study or abatement of highway noise impacts.

Public Involvement: The plans will be presented to the City Council and open to the public for approval and a PIOH will be held at the City of Duluth.

Major stakeholders: GDOT, travelling public, adjacent residents, adjacent businesses, City of Duluth, Gwinnett County and Norfolk Southern Railroad.

CONSTRUCTION

Issues potentially affecting constructability/construction schedule: All proposed improvements will need to avoid impacting the existing grade-separated railroad crossing to prevent any disturbance to the rail lines and the structure of the bridge. The expectation is that improvements within the right-of-way will be limited to the two signalized intersections on Buford Highway. Any work to be completed in the area of the traffic signals on Buford Highway will be conducted during off-peak times, to avoid impacting rush hour traffic.

Early Completion Incentives recommended for consideration: ☒ No ☐ Yes

COORDINATION, ACTIVITIES, RESPONSIBILITIES, AND COSTS

Initial Concept Meeting: Not Required

Concept Meeting: Not Required

Project Activity	Party Responsible for Performing Task(s)
Concept Development	Pond for City of Duluth
Design	Pond with City of Duluth and GDOT Review
Right-of-Way Acquisition	N/A
Utility Relocation	Utility owners
Letting to Contract	City of Duluth
Construction Supervision	City of Duluth
Providing Material Pits	Contractor
Providing Detours	N/A
Environmental Studies, Documents, & Permits	Pond/ SEI with GDOT Review
Environmental Mitigation	N/A
Construction Inspection & Materials Testing	City of Duluth, Consulting Firm TBD

Other coordination to date: A presentation to City Council occurred on 3/28/2016.

Project Cost Estimate Summary and Funding Responsibilities:

	PE Activities		ROW	Reimbursable Utilities	CST*	Environmental Mitigation	Total Cost
	Breakdown of PE	Section 404 Mitigation					
Funded By	L240L		--	--	Z240L	--	
$ Amount	$270,000		$0	$0	$924,555.49	$0	$1,194.555.40
Date of Estimate	5-19-14		N/A	N/A	10/11/2016	N/A	

*CST Cost includes: Construction, Engineering and Inspection, Contingencies and Liquid AC Cost Adjustment.

ALTERNATIVES DISCUSSION

Alternative selection:

Alternative Preferred: This alternative includes landscaping, lighting, signage and marking modifications to the existing areas at the interchange's ramp termini. Landscape enhancements to the grassed interiors of the interchange's loop ramps and to other open space will improve visual appearance of a critical gateway to the City of Duluth. Installation of additional wayfinding signage and adjustments to existing signage will be made to improve the current navigability of the interchange. The addition of lighting that will cover both roadway and pedestrians will also be located and designed to improve navigability of the interchange. Raised Pavement Markings will be considered for installation at median noses and at guardrail endcaps, as well as along left turn striping. Per the recommended alternative from the traffic study, no changes will be made at the Buford Highway/Pleasant Hill/ May Road merge area.			
Estimated Property Impacts:	**0**	**Estimated Total Cost:**	**$924,559 apprx**
Estimated ROW Cost:	**$0**	**Estimated CST Time:**	**6 months**
Rationale: This alternative was chosen by the City of Duluth because it improves the operations of the interchange through several design approaches and will be the most comprehensive in terms of addressing the deficiencies of this interchange.			

No-Build Alternative: Maintain existing lane geometry at signalized intersections on Buford Highway; maintain existing acceleration lane length at southeast-bound on ramp to Pleasant Hill Road. Per the recommended alternative from the traffic study, no changes to be made at the Buford Highway/Pleasant Hill/ May Road merge area.			
Estimated Property Impacts:	**N/A**	**Estimated Total Cost:**	**$0**
Estimated ROW Cost:	**$0**	**Estimated CST Time:**	**N/A**
Rationale: This alternative does not address the issues identified in the project's justification statement.			

Alternative 2: Installation of additional minimal wayfinding signage and adjustments to existing signage to improve the current navigability of the interchange. Per the recommended alternative from the traffic study, no changes to be made at the Buford Highway/Pleasant Hill/ May Road merge area.			
Estimated Property Impacts:	**$0**	**Estimated Total Cost:**	**$80,000**
Estimated ROW Cost:	**$0**	**Estimated CST Time:**	**3 months**
Rationale: Limiting the modifications to wayfinding only does not address the full requirement to improve operations and appearance of this intersection.			

LIST OF ATTACHMENTS/SUPPORTING DATA

1. Concept Layouts
    a. Project Area
    b. Landscape and Enhancement Opportunity Areas
    c. Conceptual Lighting Areas
    d. Signage
    e. Landscape Concepts
2. Detailed Cost Estimates:
    a. Construction including Engineering and Inspection and Contingencies
3. Traffic Operations Analysis
4. Concept Team Kickoff Meeting (2015-10-15)
5. Minutes of Concept Meeting: City Council Workshop on (2016-03-28)
6. Concept Team Minutes (2015-07-07)
7. Duluth/Pond Concept Meeting Minutes (2016-8-15)
8. Lighting Commitment

Duluth
Capture the Spirit of Good Living

Interchange Site Area (Acres)

GATEWAY DESIGN IMPROVEMENTS: PLEASANT HILL RD/ BUFORD HWY. INTERCHANGE

Project Number: ARC TIP: GW-392
P. I. Number: 0013062
County: Gwinnett County

LANDSCAPE & ENHANCEMENT OPPORTUNITY AREAS

60 0 60 120
SCALE: 1" = 60'

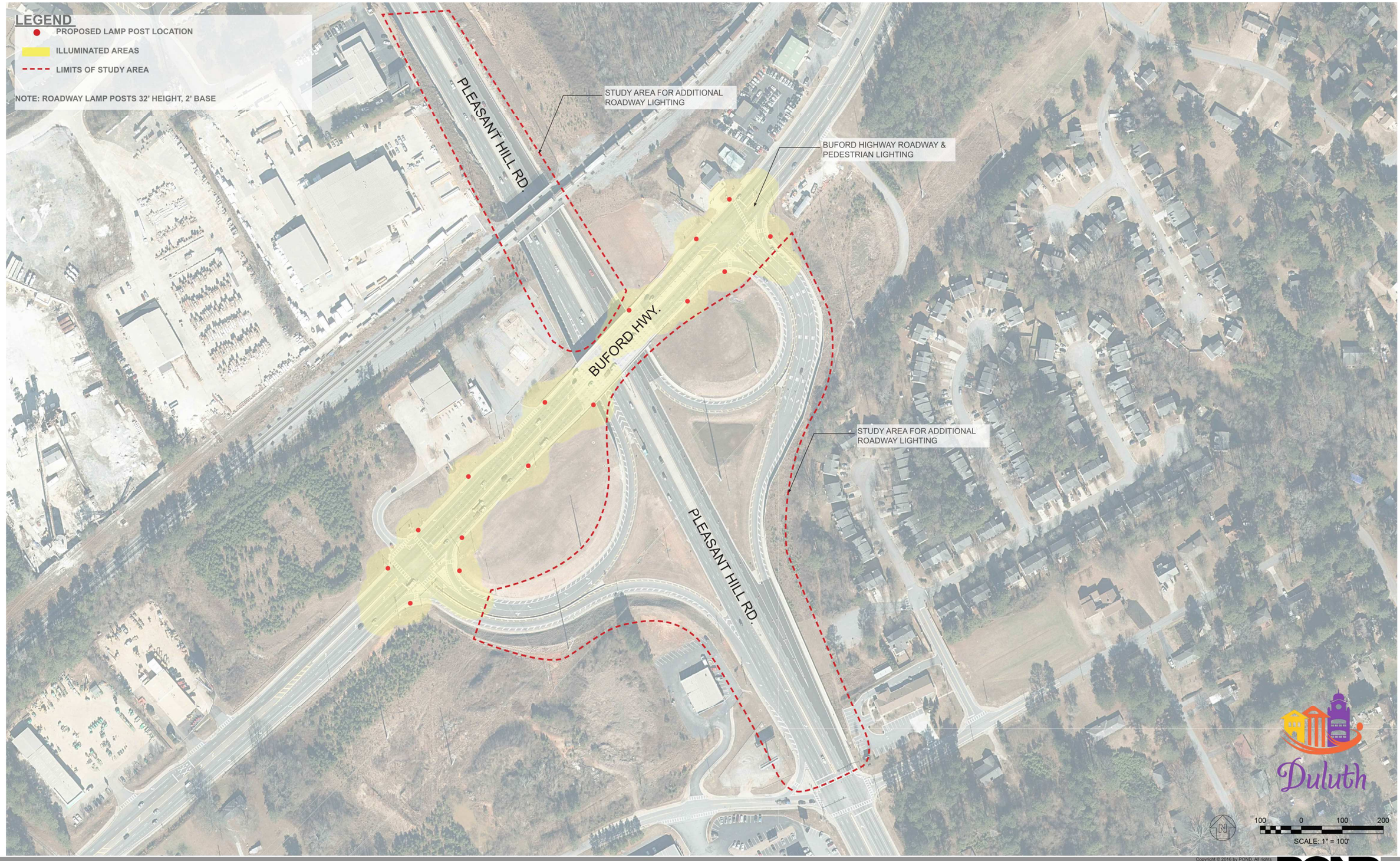
POND

Duluth
Capture the Spirit of Good Living

PLEASANT HILL- DULUTH INTERCHANGE LANDSCAPE

LIGHTING PLAN AND STUDY AREAS

AUGUST 29, 2016

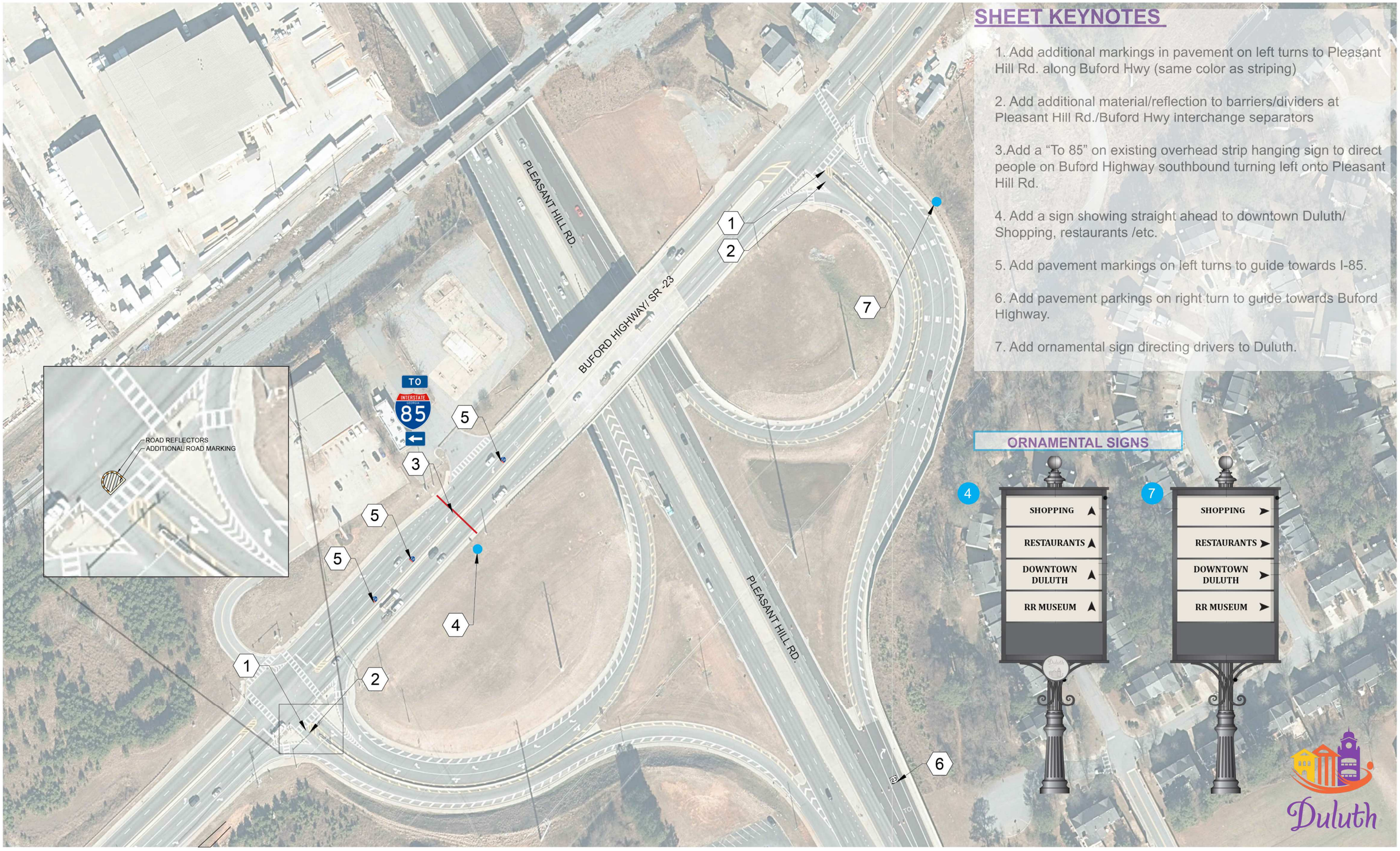


POND

PLEASANT HILL- DULUTH INTERCHANGE LANDSCAPE

SIGNING & MARKING

AUGUST 29, 2016



SHEET KEYNOTES

1. Add additional markings in pavement on left turns to Pleasant Hill Rd. along Buford Hwy (same color as striping)

2. Add additional material/reflection to barriers/dividers at Pleasant Hill Rd./Buford Hwy interchange separators

3.Add a “To 85” on existing overhead strip hanging sign to direct people on Buford Highway southbound turning left onto Pleasant Hill Rd.

4. Add a sign showing straight ahead to downtown Duluth/ Shopping, restaurants /etc.

5. Add pavement markings on left turns to guide towards I-85.

6. Add pavement parkings on right turn to guide towards Buford Highway.

7. Add ornamental sign directing drivers to Duluth.

POND

PLEASANT HILL- DULUTH INTERCHANGE LANDSCAPE

LANDSCAPE CONCEPT 1: RADIAL

AUGUST 29, 2016

SCULPTURE LOCATION

ORNAMENTAL TREES, TYP.

DECIDUOUS TREES, TYP.

EVERGREEN TREES, TYP.

RAIN GARDEN LANDSCAPE

REFORESTATION AREA

SCULPTURE LOCATION

MOUNDED BOULDER AREA

WILDFLOWER MEADOW

PROJECT LIMITS

Duluth

40 0 40 80

SCALE: 1" = 40'

POND

PLEASANT HILL- DULUTH INTERCHANGE LANDSCAPE

LANDSCAPE CONCEPT 2: FOREST ORCHARD

AUGUST 29, 2016

1

SCULPTURE LOCATION

DECIDUOUS TREES, TYP.

RAIN GARDEN LANDSCAPE

SCULPTURE LOCATION

GRASSES AND PERENNIALS

WILDFLOWER MEADOW

2

PROJECT LIMITS

Duluth

40 0 40 80

SCALE: 1" = 40'

POND

PLEASANT HILL- DULUTH INTERCHANGE LANDSCAPE

LANDSCAPE CONCEPT 3: BRAIDED LANDSCAPE

AUGUST 29, 2016

SCULPTURE LOCATION

EVERGREEN SHRUBS, TYP.

REFORESTATION AREA

PERENNIAL BED

GRASSES

ORNAMENTAL TREES, TYP.

DECIDUOUS TREE-SPECIES 1, TYP.

EVERGREEN TREE, TYP.

RAIN GARDEN LANDSCAPE

SCULPTURE LOCATION

WILDFLOWER MEADOW

PROJECT LIMITS

Duluth

40 0 40 80

SCALE: 1" = 40'

POND

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE P.I. No. **0013062** **OFFICE** Program Delivery

PROJECT DESCRIPTION
SR 13 @ CS 1181/Pleasnt Hill Rd

DATE October 11, 2016

From: Albert V. Shelby III, State Program Delivery Engineer

To: Lisa L. Myers, State Project Review Engineer
via Email Mailbox: **CostEstimatesandUpdates@dot.ga.gov**

Subject: REVISIONS TO PROGRAMMED COSTS

PROJECT MANAGER Robert Reid

MGMT LET DATE 9/15/2018

MGMT ROW DATE

PROGRAMMED COSTS (TPro W/OUT INFLATION) **LAST ESTIMATE UPDATE**

CONSTRUCTION	$	1,030,701.16	DATE	
RIGHT OF WAY	$		DATE	
UTILITIES	$		DATE	

REVISED COST ESTIMATES

CONSTRUCTION*	$	924,555.49
RIGHT OF WAY	$	
UTILITIES	$	

*Cost Contains **10** % Contingency

REASONS FOR COST INCREASE AND CONTINGENCY JUSTIFICATION:

Project Type: Reconstruction/Rehabilitation Risk: Low Contingency: 10%
Annual Updates.

CONTINGENCY SUMMARY

A.	**CONSTRUCTION COST ESTIMATE:**	$ 800,378.55	Base Estimate From CES		
B.	**ENGINEERING AND INSPECTION (E & I):**	$ 40,018.93	Base Estimate (A) x	5	%
C.	**CONTINGENCY:**	$ 84,039.75	Base Estimate (A) + E & I (B) x	10	%
			See % Table in "Risk Based Cost Estimation" Memo		
D.	**TOTAL LIQUID AC ADJUSTMENT:**	$ 118.26	Total From Liquid AC Spreadsheet		
E.	**CONSTRUCTION TOTAL:**	$ **924,555.49**	(A + B + C + D = E)		

REIMBURSABLE UTILTY COSTS

UTILITY OWNER	REIMBURSABLE COST
TOTAL	**$ -**

ATTACHMENTS: (File Copy in the Project Cost Estimate Folder)

Detailed Cost Estimate Printout From TRAQS

PROJ. NO.		CALL NO.	0/00/2016
P.I. NO.			
DATE			

INDEX (TYPE)	**DATE**	**INDEX**
REG. UNLEADED	Oct-16	$ 2.318
DIESEL		$ 2.390
LIQUID AC		$ 339.00

Link to AC Index:
http://www.dot.ga.gov/PS/Materials/AsphaltFuelIndex

LIQUID AC ADJUSTMENTS

PA=[((APM-APL)/APL)]xTMTxAPL

Asphalt

Price Adjustment (PA)				**111.87**	**$ 111.87**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	542.40	
Monthly Asphalt Cement Price month project let (APL)			$	339.00	
Total Monthly Tonnage of asphalt cement (TMT)				0.55	

ASPHALT	**Tons**	**%AC**	**AC ton**
Leveling		5.0%	0
12.5 OGFC		5.0%	0
12.5 mm	11	5.0%	0.55
9.5 mm SP		5.0%	0
25 mm SP		5.0%	0
19 mm SP		5.0%	0
	11		**0.55**

BITUMINOUS TACK COAT

Price Adjustment (PA)				**6.99**	**$ 6.99**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	542.40	
Monthly Asphalt Cement Price month project let (APL)			$	339.00	
Total Monthly Tonnage of asphalt cement (TMT)				0.034360807	

Bitum Tack Gals	gals/ton	tons
8	232.8234	0.03436081

BITUMINOUS TACK COAT (surface treatment)

Price Adjustment (PA)				**0**	**$ -**
Monthly Asphalt Cement Price month placed (APM)	Max. Cap	60%	$	542.40	
Monthly Asphalt Cement Price month project let (APL)			$	339.00	
Total Monthly Tonnage of asphalt cement (TMT)				0	

Bitum Tack	SY	Gals/SY	Gals	gals/ton	tons
Single Surf. Trmt.		0.20	0	232.8234	0
Double Surf.Trmt.		0.44	0	232.8234	0
Triple Surf. Trmt		0.71	0	232.8234	0
					0

TOTAL LIQUID AC ADJUSTMENT	**$ 118.86**

STATE HIGHWAY AGENCY

DATE : 10/11/2016
PAGE : 1

JOB DETAIL ESTIMATE

JOB NUMBER : 0013062 SPEC YEAR: 13
DESCRIPTION: PLEASANT HILL-BUFORD HWY INTERCHANGE

ITEMS FOR JOB 0013062

LINE	ITEM	ALT	UNITS	DESCRIPTION	QUANTITY	PRICE	AMOUNT
0001	150-1000		LS	TRAFFIC CONTROL - TRAFFIC CONTROL	1.000	28000.00	28000.00
0002	210-0100		LS	GRADING COMPLETE - GRADING COMPLETE	1.000	98771.09	98771.09
0003	402-3130		TN	RECYL AC 12.5MM SP,GP2,BM&HL	11.000	76.04	836.47
0004	413-0750		GL	TACK COAT	8.000	3.04	24.32
0005	432-0206		SY	MILL ASPH CONC PVMT/ 1.50 DEP	0.000		
0008	441-0018		SY	DRIVEWAY CONCRETE, 8 IN TK	12.000	53.43	641.27
0009	441-0748		SY	CONC MEDIAN, 6 IN	13.000	58.49	760.40
0014	441-4030		SY	CONC VALLEY GUTTER, 8 IN	75.000	52.33	3925.25
0018	550-1180		LF	STM DR PIPE 18,H 1-10	0.000		
0019	636-2070		LF	GALV STEEL POSTS, TP 7	13.000	11.74	152.75
0022	636-1033		SF	HWY SIGNS, TP1MAT,REFL SH TP 9	9.000	24.78	223.05
0023	636-1036		SF	HWY SGN,TP1MAT,REFL SH TP 11	18.000	20.02	360.36
0024	636-1041		SF	HWY SIGNS,TP 2MAT,REFL SH TP 9	32.000	34.18	1093.81
0027	653-0110		EA	THERM PVMT MARK, ARROW, TP 1	2.000	71.14	142.30
0028	653-0112		EA	THERM PVMT MKG, ARW, TP 1A	2.000		

76.34	152.68				
0029	653-1501	LF	THERMO SOLID TRAF ST 5 IN, WHI		100.000
1.10	110.77				
0034	653-3501	GLF	THERMO SKIP TRAF ST, 5 IN, WHI		100.000
0.55	55.06				
0039	653-6004	SY	THERM TRAF STRIPING, WHITE		1500.000
3.60	5404.22				
0043	654-1010	EA	RAISED PVMT MARKERS TP 10		24.000
38.05	913.37				
0044	668-1100	EA	CATCH BASIN, GP 1		0.000
2442.00	0.00				
0049	163-0001	LS	EROSION CONTROL, NON-REFUNDABLE DEDUCT		1.000
60000.00	60000.00				
0054	700-6001	LS	GRASSING - COMPLETE		1.000
3380.00	3380.00				
0059	700-9300	SY	SOD		250.000
21.48	5370.00				
0064	701-0010	AC	WILDFLOWER SEEDING		2.000
1500.00	3000.00				
0069	701-0016	LB	PELLETIZED LIME		100.000
25.00	2500.00				
0074	701-0020	LB	FERTILIZER MIXED GRADE		100.000
15.00	1500.00				
0079	701-0030	TN	AGRICULTURAL LIME		6.000
122.00	732.00				
0084	701-0040	AC	HERBICIDE		1.000
500.00	500.00				
0089	702-0006	EA	ABELIA X GRANDIFLORA - 0		600.000
35.00	21000.00				
0094	702-0010	EA	ACER BARBATUM - 0		22.000
400.00	8800.00				
0099	702-0030	EA	ACER RUBRUM - 0		18.000
397.33	7151.94				
0104	702-0051	EA	AMELANCHIER X GRANDIFLORA - 0		24.000
317.50	7620.00				
0109	702-0350	EA	HYPERICUM CALYCINUM - 0		800.000
15.00	12000.00				
0114	702-0480	EA	JASMINUM FLORIDUM - 0		500.000
25.00	12500.00				
0119	702-0575	EA	LIRIODENDRON TULIPIFERA - 0		40.000
400.00	16000.00				
0124	702-0630	EA	MAGNOLIA GRANDIFLORA - 0		18.000
400.00	7200.00				
0129	702-0640	EA	MAGNOLIA VIRGINIANA - 0		18.000
400.00	7200.00				
0134	702-0678	EA	MULLENBERGIA CAPILLARIS- 0		700.000
15.00	10500.00				

0139	702-0770	EA	PINUS ELLIOTTI - 0	30.000	
300.00	9000.00				
0144	702-0793	EA	PISTACIA CHINENSIS - 0	18.000	
350.00	6300.00				
0149	702-0897	EA	QUERCUS NUTTALLI - 0	30.000	
450.00	13500.00				
0154	702-0969	EA	RHUS SP - 0	52.000	
200.00	10400.00				

STATE HIGHWAY AGENCY

DATE : 10/11/2016
PAGE : 2

JOB DETAIL ESTIMATE

0157	702-0719	EA	PANICUM VIRGATUM - 0	500.000	
20.00	10000.00				
0158	702-0140	EA	CERCIS CANADENSIS - 0	30.000	
300.00	9000.00				
0159	702-1120	EA	YUCCA FILAMENTOSA - 0	300.000	
30.00	9000.00				
0163	603-2024	SY	STN DUMPED RIP RAP, TP 1, 24	70.000	
59.17	4142.51				
0164	603-7000	SY	PLASTIC FILTER FABRIC	70.000	
4.92	344.96				
0169	702-9025	SY	LANDSCAPE MULCH	6000.000	
7.92	47520.00				
0174	766-7020	LS	IRRIGATION SYSTEM	1.000	
16000.00	16000.00				
0179	708-1000	CY	PLANT TOPSOIL	800.000	
63.00	50400.00				
0184	005-0002	LS	INSTALL/LIGHTING FACILITIES	1.000	
255000.00	255000.00				
0189	608-4000	LF	BRICK WALL	250.000	
125.00	31250.00				
0194	500-3201	CY	CL B CONC, RET WALL	0.000	

ITEM TOTAL
800378.55
INFLATED ITEM TOTAL
800378.55

TOTALS FOR JOB 0013062

ESTIMATED COST:
800378.58
ESTIMATED TOTAL:
800378.58

Traffic Operation Analysis

FOR

US 23/SR 13/Buford Highway at Pleasant Hill Road
Intersection Improvements
PI No. 0013062
Duluth, Gwinnett County, Georgia

Prepared For:

Pond & Company

3500 Parkway Lane, Suite 600

Norcross, GA 30092

Prepared by:

2470 Sandy Plains Rd

Marietta, Georgia 30066

August 25, 2016

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

Southeastern Engineering Inc. (SEI) has conducted a traffic study to determine the impacts of an intersection improvement project in the City of Duluth, Georgia. The proposed project is for improvements at US 23/SR 13/Buford Highway (Buford Highway) at Pleasant Hill Road.

Capacity analyses and level of service evaluations of the intersections in the project area were conducted for the existing condition, future condition without the project (No Build), and future condition with the proposed project (Build).

Design elements such as wayfinding signage and lighting will be implemented as part of this project and will be valuable for improving traffic flow and improving safety, but they are more qualitative measures than quantitative. For that reason, this report focuses on the analysis of the southbound weave area between the Buford Highway off-ramp and the May Road intersection; however, **the implementation of improving elements, such as improved signing and marking, which will also be implemented as part of this project, should be pursued as relatively low-cost improvements that can have large benefits for the driving public.**

For the southbound weave area between the Buford Highway off-ramp and May Road, this weave area operates acceptably in the existing (2016) and Opening (2019) weekday peak hour conditions but is expected to see increased congestion by 2039 during the PM peak hour. Modifications to striping in this area were considered and were reviewed by the Gwinnett County Department of Transportation (Gwinnett DOT) as options in the 2010 Signing and Marking Plan (STP-189-1(29)). In this report, updated analysis was performed on three options: retaining the existing geometry (as was recommended by Gwinnett DOT in 2010) and two potential options for restriping this area.

Upon review of the analysis, **Gwinnett DOT recommended that retaining the existing geometry was the best alternative at this time.** This recommendation was made because of safety concerns on alternative striping measures that had been raised during the original (2010) geometric review.

This area is expected to have acceptable operations in the existing and near future. Future congestion in this area should be observed to ensure the existing geometry maintains acceptable operations.

INTRODUCTION

Background

Southeastern Engineering, Inc. (SEI) has provided traffic services as part of the Buford Highway at Pleasant Hill Road Intersection Improvements study (PI 0013062, ARC TIP: GW-392, also referenced as the SR 13 at Pleasant Hill study) in the City of Duluth, Gwinnett County, Georgia. The Buford Highway at Pleasant Hill Road study area is shown in Figure 1 and the existing intersection aerial map is shown in Figure 2.

Figure 1: Area Map: Project Location

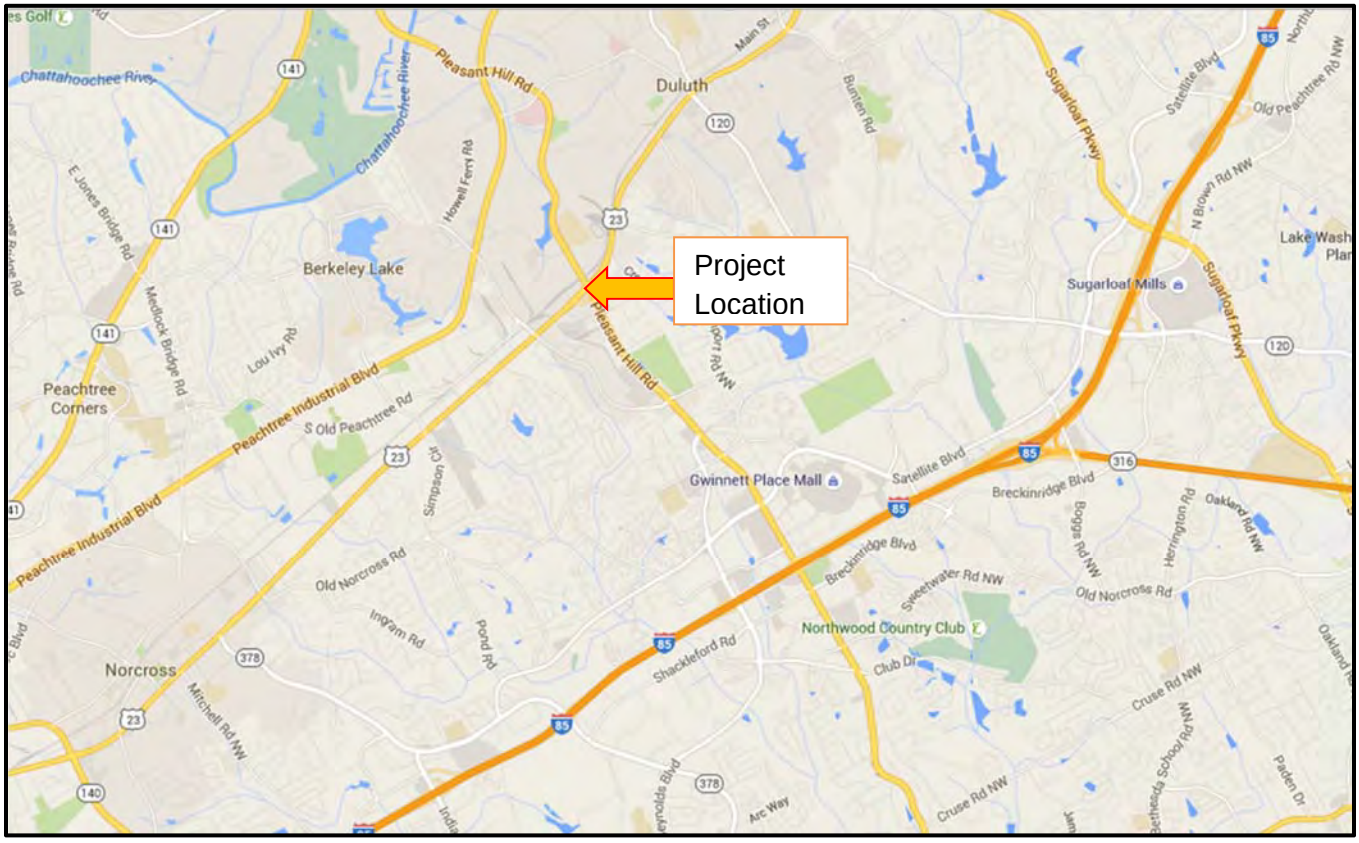


Figure 2: Study Area Aerial Map

SEI has performed peak hour traffic analysis for the existing year (2016) conditions, the Opening Year (2019) No Build and Build conditions, and the Design Year (2039) No Build and Build conditions.

Project Description

Proposed improvements are intended to address design elements such as wayfinding signage and lighting elements for visibility. These design elements are valuable for improving traffic flow and improving safety but are not easily quantified in a traffic level of service (LOS) or simulation analysis. This report focuses on the analysis of the southbound weave area from the Buford Highway off-ramp and the May Road intersection.

EXISTING CONDITIONS

The transportation facilities within the study area are described as follows:

Roadways

Pleasant Hill Road

Within the study area, Pleasant Hill Road is an Urban Principal Arterial with a posted speed limit of 45 miles per hour (mph). Pleasant Hill Road extends northwest from its connection to US 29 (Lawrenceville Highway) to the Chattahoochee River, where it changes names to State Bridge Road. Within the study area, Pleasant Hill Road has three travel lanes in each direction with curb and gutter and sidewalk on both sides of the roadway.

US 23/SR 13/Buford Highway

Buford Highway is functionally classified as an Urban Minor Arterial with a posted speed limit of 45 mph. This roadway serves both local and commuter traffic and has curb and gutter and sidewalk facilities.

May Road

Within the study area, May Road is a two-lane roadway that is functionally classified as a Local Road with a posted speed limit of 25 mph. May Road connects with a railroad crossing near Buford Highway and has some cut-through traffic because of the connection between Buford Highway and Pleasant Hill Road.

Sunset Street

Within the study area, Sunset Street is functionally classified as a Local Road and serves residential development.

Bicycle and Pedestrian Facilities

The roadways in this area are not identified as pedestrian or bicycle connections in the Gwinnett County 2014 Open Space and Greenway Master Plan Update. There are sidewalks provided in the vicinity of the Pleasant Hill at May Road / Sunset Street intersection, but pedestrian volumes are currently very low in this area during peak periods.

Mass Transit

This study area does not have any current Gwinnett County Transit bus route stops.

Traffic Data Collection

In order to create the existing and future traffic flow diagrams, SEI obtained traffic count data within the study area. The original traffic data sheets are included in Appendix A and the traffic flow diagrams are included in Appendix C.

Four-Hour Turning Movement Counts (1 location)

Turning movement counts were performed during the weekday AM and PM peak periods (7:00-9:00 AM and 4:00-6:00 PM, respectively) at the following intersection:

- Pleasant Hill Road at May Road/Sunset Street

The four consecutive 15-minute interval volumes, summed to produce the highest volume at each intersection, were then determined. These volumes make up the peak hour traffic volumes for the intersection counted.

24-Hour Single-directional Traffic Volume Classification Counts (2 locations)

Traffic volume and classification counts were conducted for 24 hours for one travel direction along the following roadway segments:

- Northbound Ramp from Pleasant Hill Road to Buford Highway
- Southbound Ramp from Buford Highway to Pleasant Hill Road

24-Hour Bi-directional Traffic Volume Classification Counts (1 location)

Traffic volume and classification counts were conducted for 24 hours for both travel directions along the following roadway segment:

- Pleasant Hill Road south of May Road/Sunset Street

24-Hour Bi-directional Traffic Volume Counts (1 location)

Traffic volume counts were conducted for 24 hours for both travel directions along the following roadway segment:

- May Road west of Pleasant Hill Road*

*Based on field validation, the May Road ADT was increased for a commercial driveway (liquor store) that was not captured by the tube placement but had high evening activity that impacted the signalized intersection.

Study Intersection Growth Trends

SEI determined historic traffic growth trends based on the past fifteen years of data provided at Georgia Department of Transportation (GDOT) count stations (where available). Trend line graphs were prepared for five, ten, and fifteen year trends. Based on comments received from the GDOT Office of Planning on March 30, 2016, no estimated GDOT GeoCOUNTS values were used for the trendline calculations.

SEI performed a trend analysis that conforms to specific Design Manual Guidance. Historical data from nearby GDOT count stations was analyzed from 1999 to 2014. Table 1 shows the analysis of historical annual average daily traffic (AADT) volumes recorded by GDOT count stations located in Gwinnett County.

Table 1 GDOT Historical Growth Rate

Station #	Location	5-Year Growth Rate	10-Year Growth Rate	15-Year Growth Rate
1350416	Pleasant Hill Road south of May Road	--	-0.7%	-0.1%
1350568	Pleasant Hill Road north of SR 13	--	1.0%	-0.8%
5-Year, 10-Year, and 15-Year Averages		**--**	**0.1%**	**-0.4%**
Weighted Average		**-0.4%**		

As shown in Table 1, the weighted historical growth rate for the traffic recorded at these GDOT count stations shows a very little to flat growth in the ten to fifteen year analysis. The five Year Growth Rate could not be calculated because only one tube count was taken at each count station within that five-year period. The GeoCounts website summary information for these count stations is included in Appendix B.

In order to account for the most recent year's count data, a growth rate was determined for the last two years of field-based data at both count stations, as shown in Table 2.

Table 2 GDOT Historical Growth Rate: Last Two Years Field-Based Data

Station	Location	GDOT AADT Volume (vpd)				Annual Growth Rate
		2006	2008	2011	2012	
1350416	Pleasant Hill Road south of May Road		29,380		44,540	11.0%
1350568	Pleasant Hill Road north of SR 13	31,610		34,960		2.0%

(vpd) = vehicles per day

The short-term growth south of Pleasant Hill Road shows an unusually strong positive growth between 2008 and 2012. Using the GDOT GeoCounts information and GDOT 2012 Traffic Factors found in Appendix B, an average weekday traffic count was obtained from the 2012 Station 1350416 GDOT field survey information and is compared to the study count data taken in 2016, as shown in Table 3.

Table 3 Pleasant Hill Road Traffic Volumes south of May Road/Sunset Street: 2012 to 2016 Comparison

Location	Day of Week (vpd)		GDOT Month Correction Factor*	Resulting ADT	Resulting Annual Growth Rate, 2012 to 2016
	Wednesday	Thursday			
Pleasant Hill Road south of May Road (Station 1350146, September 2012)	**	48,800	1.01	49,290	3.1%
Pleasant Hill Road south of May Road (Study Traffic Count, February 2016)		55,825	1.0	55,825	

* Included in Appendix B. 2014 Correction factors used for the 2016 counts, as the most recent GDOT correction factors available.
** Full day of data not available.
(vpd) = vehicles per day

No major traffic generators are identified between the study count location and the GDOT traffic count station. The short-term growth rate in Table 3 was therefore considered in determining the true growth rate.

Table 4 shows the study area growth rates from the Atlanta Regional Commission (ARC) travel demand growth rates between 2015 and 2040.

Table 4 ARC Travel Demand Model Growth Rate							
	2015			2040			Annual Growth Rate
Location	NB	SB	Total	NB	SB	Total	
Pleasant Hill south of SR 13	32,189	33,348	65,537	39,732	39,480	79,212	0.76%
Pleasant Hill north of SR 13	23,441	21,926	45,367	28,939	28,361	57,300	0.94%

Given the strong five year historical growth shown in Table 2, the relatively strong recent growth shown in Table 3, the lower historical growth rate shown in Table 1, and the ARC Travel Demand Model growth shown in Table 4, SEI used the following growth rates for traffic projections:

- 2.5% growth between the Existing Year (2014, 2015) and Opening Year (2019) conditions
- 1.0% growth between the Opening Year (2019) and Design Year (2039) conditions

K, D and T Factors

Peaking (K) and distribution (D) factors for the average for each facility are shown in Table 5.

Table 5 Study K and D Factors By Facility				
Location	**K-Factor**		**D-Factor**	
	AM	PM	AM	PM
Pleasant Hill Road Average	**0.07**	**0.08**	**0.58**	**0.62**
May Road	0.14	0.09	0.89	0.52
Sunset Street	0.05	0.08	0.70	0.64
Side Street Average	**0.10**	**0.09**	**0.79**	**0.58**
Buford Highway Off-Ramp to Pleasant Hill Road	0.07	0.08	--	--
Buford Highway On-Ramp from Pleasant Hill Road	0.10	0.07	--	--
Ramp Average	**0.08**	**0.07**	--	--

These K and D factors were used for comparison in the existing and future analysis.

The T factors for the existing and future analysis are shown in Table 6.

Table 6 Study T Factors By Approach and Facility: Peak Hours									
Location	AM			PM			ADT		
	T	SU	CU	T	SU	CU	T	SU	CU
Pleasant Hill Road	4.8	4.1	0.7	4.0	3.5	0.5	4.3	3.8	0.5
Buford Highway Off-Ramp to Pleasant Hill Road	11.7	7.3	4.4	7.7	6.2	1.5	8.4	5.8	2.6
Buford Highway On-Ramp from Pleasant Hill Road	8.8	8.2	0.6	3.5	2.4	1.1	8.9	6.8	2.1

T = Total Trucks, SU = single unit trucks, CU = combination unit trucks

Overall, the truck percentage on Pleasant Hill Road is fairly typical for a major suburban arterial route in the metro Atlanta area. The significant truck percentage merging in from the Buford Highway off-ramp was incorporated in the traffic analysis.

Balanced flow diagrams are included in Appendix C and were prepared as follows:

- Existing 2016 Peak Hour Traffic (Figure 1)
- Opening Year 2019 Peak Hour Traffic No Build and Build (Figure 2)
- Design Year 2039 Peak Hour Traffic No Build and Build (Figure 3)
- Existing 2016 Average Daily Traffic (Figure 4)
- Opening and Design Years (2019 and 2039) Average Daily Traffic No Build and Build (Figure 5)

Crash History

Crash reports were obtained from the GDOT GEARS crash database for 2012, 2013, and 2014. Crashes were obtained for the 0.25-mile stretch of Pleasant Hill Road that includes the northbound ramp from Pleasant Hill Road to Buford Highway, the southbound ramp from Buford Highway to Pleasant Hill Road and the intersection of Pleasant Hill Road with May Road. The rates are compared to the GDOT statewide average crash rates for an urban principal arterial, non-freeway, non-NHS in Table 7. All crash rates shown are per 100 million vehicle miles traveled.

Table 7 Pleasant Hill Road Crash Rates from Northbound On/Southbound Off-Ramp at Buford Highway to May Road/Sunset Street

Year	Crash Rate	Injury Rate	Fatality Rate
	study rate **[statewide average rate]**		
2012	394 **[594]**	221 **[139]**	0 **[1.30]**
2013	466 **[1017]**	74 **[188]**	0 **[1.43]**
2014	221 **[1052]**	74 **[190]**	0 **[1.40]**

As shown in Table 7, this segment of Pleasant Hill Road has crash rates below the statewide average for 2012 through 2014. The statewide average rate for injuries is exceeded for 2012 but was below average in 2013 and 2014. However, the crash data did have an anomaly at the May Road/Sunset Street intersection. No crashes were recorded in the GEARS database between 11/7/2013 and 6/7/2014 for this intersection. The crash data for this period may be underrepresented, and therefore the 2012 study year is considered the most relevant for analysis purposes.

The intersection crash data was also investigated to determine whether a particular incident type (such as angle or rear end crashes) was the most prevalent. Identifying the predominant type of crash that occurs at an intersection can help identify potential safety solutions. The types of crashes at the Pleasant Hill Road at May Road/Sunset Street intersection are summarized in Table 8.

Table 8 Pleasant Hill Road Crash Types at May Road/Sunset Street

Crash Type (Intersection)	Total	Overall Percentage
Angle	9	25%
Head On	1	3%
Rear End	20	56%
Sideswipe - Same Direction	5	13%
Sideswipe - Opposite Direction	0	0%
Not A Collision With A Motor Vehicle	1	3%
Total	**36**	**100%**

As shown in Table 8, rear end and angle crashes are the predominant vehicle crash type at the study intersection. Rear end crashes are also the predominant (86%) crash type at the southbound off-ramp merge north of the May Road intersection. Rear end collisions are a typical occurrence on congested facilities or at signalized intersections. At the intersection itself, the rear end crashes are evenly split between northbound Pleasant Hill Road and southbound Pleasant Hill Road.

As a note, this report has defined Pleasant Hill Road as the north/south roadway at the Pleasant Hill Road at May Road/Sunset Street intersection. However, the crash reports at this intersection are recorded with northbound Pleasant Hill Road coded as the westbound direction and southbound Pleasant Hill Road coded as the eastbound direction. Any future directional traffic crash analysis should confirm the definitions of the roadway orientations.

At a signalized intersection, angle crashes can occur when drivers crossing the opposing main traffic flow during a permitted left turn are taking insufficient gaps in traffic (i.e., sneakers/jumpers). Additionally, if side-street traffic is within the intersection after clearance intervals (yellow and all-red indicators) complete, angle crashes can occur at intersection conflict points. This type of driver behavior most typically occurs when drivers

on these movements experience long delays and are willing to take smaller gaps rather than continue to wait.

TRAFFIC ANALYSIS

The study intersections were analyzed for the existing condition, future conditions with the existing geometry, and future conditions with considered improvements. All analyses conducted as part of this study have been based on the data collected for the existing condition and the traffic flow diagrams included in Appendix C.

Level of Service Methodology

Intersection capacity analyses were performed to determine the existing traffic conditions within the study area using the methodology outlined in the 2010 Highway Capacity Manual (HCM). This methodology is the industry standard for the evaluation of intersection capacity and delay. In order to facilitate the analysis, computer software Synchro and HCS 2010 were used. This software conforms to the methodology of the HCM. The vehicular delay value that results from the Synchro analysis is used to determine the level of service of an intersection.

Level of service (LOS) is a letter designation used to describe traffic operating conditions, on a declining scale from A to F. LOS “A” represents free-flow traffic conditions and LOS “F” represents extreme delays with stopped traffic conditions. The following tables indicate the relationship between delay and LOS for signalized intersections.

Table 9 LOS for Signalized Intersections

Level of Service	Control Delay Per Vehicle (sec)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

The typical HCM methodology (Synchro) is a macrosimulation model. Microsimulation (SimTraffic) was also used to look at the interaction between the weave area and the nearby signalized intersection within the study area. Microsimulation models track individual vehicle movements on a second or subsecond basis, where macroscopic models (such as the Synchro HCM analysis) analyze traffic streams as a whole by

evaluating overall characteristics such as flow, density, and mean speed. Synchro also does not provide LOS or delay results for unsignalized merge locations. The network was analyzed in the SimTraffic microsimulation to determine the merge area delay and queueing within the study area over the course of the entire peak hour. Five runs of the microsimulation model were performed and averaged to get typical results.

Existing Intersection Capacity and Simulation Analysis

The results for existing LOS conditions are shown in Table 10. The resulting queue lengths for the critical movements interacting within the weave area are shown in Table 11. The Existing (2016) detailed analysis is in included in Appendix D for the Synchro analysis and Appendix E for the SimTraffic analysis.

Table 10 Existing Traffic Operations

Pleasant Hill Road at May Road/Sunset Street Intersection	AM Peak		PM Peak	
	LOS	Delay (sec)	LOS	Delay (sec)
Existing Conditions	B	10	B	11

Table 11 Study Area Results (Existing) Using SimTraffic Simulation

Pleasant Hill Road at May Road/Sunset Street Intersection	Eastbound Right Queue from Buford Off-Ramp to Pleasant Hill Road	Southbound Through Queue on Pleasant Hill Road at May Road Intersection
Existing Conditions Average Delay/Vehicle (sec)	27	8
Existing Conditions 50th Percentile – Average Queue (ft)	133	126
Existing Conditions 95th Percentile Queue (ft)	279	237

* Maximum of the two peak hour conditions

The queue lengths shown in Table 11 are reasonably consistent with those observed during field visits.

PROPOSED PROJECT IMPROVEMENTS

Updated analysis was performed on three potential options: retaining the existing geometry (as was recommended in the 2010 Signing and Marking Plan) and two alternative options for restriping this area.

Alternative 1: Do Nothing (No Build)

The first alternative considered was to leave the roadway geometry as is in the existing condition.

The study area was evaluated for the Opening (2019) and Design (2039) No Build years. The LOS and delay results for the signalized study intersection are shown in Table 12. The resulting microsimulation queue lengths for the critical movements interacting within the weave area are shown in Table 13 for the 2019 No Build conditions and in Table 14 for the 2039 No Build conditions. The No Build detailed analysis is included in Appendix D for the Synchro analysis (Table 12) and Appendix E for the SimTraffic analysis (Table 13 and Table 14).

Table 12 No Build Traffic Operations

Pleasant Hill Road at May Road/Sunset Street Intersection	AM Peak		PM Peak	
	LOS	Delay (sec)	LOS	Delay (sec)
2019 No Build Conditions	B	12	B	12
2039 No Build Conditions	C	22	B	16

Table 13 Study Area Results (2019 No Build) Using SimTraffic Simulation

Pleasant Hill Road at May Road/Sunset Street Intersection	Eastbound Right Queue from Buford Off-Ramp to Pleasant Hill Road	Southbound Through Queue on Pleasant Hill Road at May Road Intersection
No Build 2019 Conditions Average Delay/Vehicle (sec)	52	10
No Build 2019 Conditions 50th Percentile – Average Queue (ft)	217	156
No Build 2019 Conditions 95th Percentile Queue (ft)	470	268

* Maximum of the two peak hour conditions

Table 14 Study Area Results (2039 No Build) Using SimTraffic Simulation		
Pleasant Hill Road at May Road/Sunset Street Intersection	**Eastbound Right Queue from Buford Off-Ramp to Pleasant Hill Road**	**Southbound Through Queue on Pleasant Hill Road at May Road Intersection**
No Build 2039 Conditions Average Delay/Vehicle (sec)	958**	17
No Build 2039 Conditions 50th Percentile – Average Queue (ft)	3304**	214
No Build 2039 Conditions 95th Percentile Queue (ft)	6179**	315

* Maximum of the two peak hour conditions

** Unrealistic delay/queue lengths based on microsimulation

As shown in Table 12, the study intersection is expected to continue to operate acceptably in the future weekday peak conditions by the 2039 Design Year traffic. The weave area already experiences some queuing during PM periods from vehicles waiting for a gap and those delays are expected to grow by the 2019 Opening Year, as shown in Table 13. However, traffic is still expected to operate acceptably in the opening year condition, with average delays that could be anticipated at most merge locations on a busy urban arterial during weekday PM peak conditions.

When analyzing the Design Year 2039 PM peak period for the No Build, the microsimulation results show **unrealistic** levels of queuing (over a mile) and delay (over fifteen minutes on average). In reality, enough vehicles would reroute to avoid this type of congestion that the delays and queues would be expected to be less than the results shown in Table 14. However, the microsimulation results do indicate that improvements to the weaving area would improve traffic operations at this merge point for the 2039 Design Year.

Alternative 2

The first alternative considered was to narrow Pleasant Hill Road to two lanes just north of the Buford Highway off-ramp so that its lane could become a free-flow lane. This recommendation did not require the use of additional right of way and could be managed by having a lane drop after the Buford Highway off-ramp to the north of the study area.

However, although this recommendation did make the weave area function acceptably by 2039 Design Year conditions, the PM peak hour traffic on Pleasant Hill Road bottlenecked on the two-lane section and caused extensive queuing on Pleasant Hill Road. As this was

an undesirable side effect, this alternative was not pursued further. The detailed analysis for Alternative 1 is included in Appendix D for the Synchro LOS and delay outputs and in Appendix E for the microsimulation outputs.

Alternative 3

The third alternative considered was to extend the weave area from the Buford Highway off-ramp to the May Road/Sunset Street intersection. As shown in Figure 2, vehicles exiting from the off-ramp have a short distance (approximately 170 feet) before the weave zone ends and they must merge with Pleasant Hill Road traffic. However, this lane restriction has been put into place with painted markings on existing pavement. This pavement could be used to extend the lane the full distance to May Road/Sunset Street. This proposed improvement would also require the narrowing of lane widths on Pleasant Hill Road, as there is not enough width from the striped area alone to implement within existing right-of-way.

Because this lane would then turn into a right-turn only lane, vehicles that still have some difficulty with the weave movement will be forced to either stop in the lane or turn onto May Road. However, because it increases the total weaving distance from approximately 170 feet to approximately 360 feet, it reduces the difficulty of the weave movement compared to the No Build condition.

This improvement was reviewed by Gwinnett DOT. This measure had been previously considered by Gwinnett DOT as an option in options in the 2010 Signing and Marking Plan (STP-189-1(29)) but was not pursued because of safety concerns that had been raised during the original (2010) geometric review.

Based on the findings of this traffic study and on the information from the original 2010 geometric review, Gwinnett DOT selected Alternative 1 (No Build) as the preferred alternative.

CONCLUSIONS

Qualitative measures such as wayfinding signage and lighting are established techniques for improving traffic flow for unfamiliar drivers and improving safety and will be implemented as part of this project. These measures also have the benefit of being relatively low-cost improvements that can have large associated driver benefits.

For the quantitative analysis of the southbound weave area between the Buford Highway off-ramp and May Road, the potential restriping plans considered were intended to address traffic operation and safety concerns caused by the southbound merge area. This weave area operates acceptably in the Existing and Opening (2019) weekday peak hour conditions with existing geometry. **The existing geometry (No Build) is the Preferred Alternative for the Gwinnett DOT**. This recommendation was made based on the findings of this study and safety concerns on alternative striping measures that had been raised during the original (2010) Signing and Marking Plan (STP-189-1-(29)) geometric review.

Congestion in this area should be observed to ensure the existing geometry maintains acceptable operations in the future, as traffic increases to design year volumes.

Appendix A
Traffic Count Data

Project ID: 16-9055-001
Location: Pleasant Hill Rd & May Rd_Sunset St
City: Duluth

Day: Thursday
Date: 2/4/2016

Peak Start Times	
AM	7:00 AM
MD	12:00 AM
PM	4:00 PM

Groups Printed - Cars, PU, Vans - Heavy Trucks

	Pleasant Hill Rd Northbound					Pleasant Hill Rd Southbound					May Rd_Sunset St Eastbound					May Rd_Sunset St Westbound					
Start Time	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Left	Thru	Rgt	Peds	App. Total	Int. Total
7:00 AM	36	551	3	0	590	1	272	3	0	276	2	0	2	0	4	4	2	9	0	15	885
7:15 AM	59	583	3	0	645	0	366	1	0	367	2	1	7	0	10	4	1	6	0	11	1033
7:30 AM	65	581	4	0	650	2	362	6	0	370	0	0	7	0	7	2	4	7	0	13	1040
7:45 AM	71	616	2	0	689	2	345	3	0	350	2	1	4	0	7	3	2	6	0	11	1057
Total	231	2331	12	0	2574	5	1345	13	0	1363	6	2	20	0	28	13	9	28	0	50	4015
8:00 AM	49	580	2	0	631	3	343	2	0	348	1	0	8	0	9	3	0	4	0	7	995
8:15 AM	46	629	4	0	679	3	411	5	0	419	2	2	6	0	10	7	1	19	1	27	1135
8:30 AM	48	551	3	0	602	6	344	5	1	355	1	3	6	1	10	3	0	11	0	14	981
8:45 AM	35	534	5	0	574	6	413	4	1	423	2	2	3	0	7	5	2	4	0	11	1015
Total	178	2294	14	0	2486	18	1511	16	2	1545	6	7	23	1	36	18	3	38	1	59	4126
BREAK																					
4:00 PM	10	430	6	0	446	4	450	5	1	459	1	2	15	0	18	5	0	4	0	9	932
4:15 PM	17	426	6	0	449	4	636	7	0	647	3	4	22	0	29	6	1	11	0	18	1143
4:30 PM	15	404	10	0	429	4	548	5	0	557	4	3	13	0	20	2	3	4	0	9	1015
4:45 PM	12	462	5	0	479	9	624	7	0	640	4	4	13	0	21	5	1	6	1	12	1152
Total	54	1722	27	0	1803	21	2258	24	1	2303	12	13	63	0	88	18	5	25	1	48	4242
5:00 PM	18	432	6	0	456	7	546	8	0	561	5	5	17	0	27	4	3	8	0	15	1059
5:15 PM	12	434	11	0	457	9	590	9	0	608	1	8	16	0	25	9	0	6	0	15	1105
5:30 PM	14	444	11	0	469	6	567	7	0	580	2	5	18	1	25	3	0	4	0	7	1081
5:45 PM	11	434	7	0	452	3	518	9	0	530	3	1	25	0	29	4	0	11	0	15	1026
Total	55	1744	35	0	1834	25	2221	33	0	2279	11	19	76	1	106	20	3	29	0	52	4271
Grand Total	518	8091	88	0	8697	69	7335	86	3	7490	35	41	182	2	258	69	20	120	2	209	16654
Apprch %	6.0	93.0	1.0	0.0		0.9	97.9	1.1	0.0		13.6	15.9	70.5	0.8		33.0	9.6	57.4	1.0		
Total %	3.1	48.6	0.5	0.0	52.2	0.4	44.0	0.5	0.0	45.0	0.2	0.2	1.1	0.0	1.5	0.4	0.1	0.7	0.0	1.3	
Cars, PU, Vans	515	8038	88	0	8641	69	7267	86	3	7422	34	41	178	2	253	69	20	120	2	209	16525
% Cars, PU, Vans	99.4	99.3	100.0	0.0	99.4	100.0	99.1	100.0	100.0	99.1	97.1	100.0	97.8	100.0	98.1	100.0	100.0	100.0	100.0	100.0	99.2
Heavy Trucks	3	53	0		56	0	68	0		68	1	0	4		5	0	0	0		0	129
%Heavy Trucks	0.6	0.7	0.0	0.0	0.6	0.0	0.9	0.0	0.0	0.9	2.9	0.0	2.2	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.8

Project ID: 16-9055-001
Location: Pleasant Hill Rd & May Rd_S
City: Duluth

PEAK HOURS

Day: Thursday
Date: 2/4/2016

AM

	Pleasant Hill Rd Northbound				Pleasant Hill Rd Southbound				May Rd_Sunset St Eastbound				May Rd_Sunset St Westbound				
Start Time	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM to 09:00 AM																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
7:30 AM	65	581	4	650	2	362	6	370	0	0	7	7	2	4	7	13	1040
7:45 AM	71	616	2	689	2	345	3	350	2	1	4	7	3	2	6	11	1057
8:00 AM	49	580	2	631	3	343	2	348	1	0	8	9	3	0	4	7	995
8:15 AM	46	629	4	679	3	411	5	419	2	2	6	10	7	1	19	27	1135
Total Volume	231	2406	12	2649	10	1461	16	1487	5	3	25	33	15	7	36	58	4227
% App. Total	8.7	90.8	0.5	100	0.7	98.3	1.1	100	15.2	9.1	75.8	100	25.9	12.1	62.1	100	
PHF				0.961				0.887				0.825				0.537	
Cars, PU, Vans	231	2392	12	2635	10	1439	16	1465	5	3	23	31	15	7	36	58	4189
% Cars, PU, Vans	100.0	99.4	100.0	99.5	100.0	98.5	100.0	98.5	100.0	100.0	92.0	93.9	100.0	100.0	100.0	100.0	99.1
Heavy Trucks	0	14	0	14	0	22	0	22	0	0	2	2	0	0	0	0	38
%Heavy Trucks	0.0	0.6	0.0	0.5	0.0	1.5	0.0	1.5	0.0	0.0	8.0	6.1	0.0	0.0	0.0	0.0	0.9

PM

	Pleasant Hill Rd Northbound				Pleasant Hill Rd Southbound				May Rd_Sunset St Eastbound				May Rd_Sunset St Westbound				
Start Time	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Left	Thru	Rgt	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM to 06:00 PM																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
4:45 PM	12	462	5	479	9	624	7	640	4	4	13	21	5	1	6	12	1152
5:00 PM	18	432	6	456	7	546	8	561	5	5	17	27	4	3	8	15	1059
5:15 PM	12	434	11	457	9	590	9	608	1	8	16	25	9	0	6	15	1105
5:30 PM	14	444	11	469	6	567	7	580	2	5	18	25	3	0	4	7	1081
Total Volume	56	1772	33	1861	31	2327	31	2389	12	22	64	98	21	4	24	49	4397
% App. Total	3.0	95.2	1.8	100	1.3	97.4	1.3	100	12.2	22.4	65.3	100	42.9	8.2	49.0	100	
PHF				0.971				0.933				0.907				0.817	
Cars, PU, Vans	54	1762	33	1849	31	2310	31	2372	12	22	63	97	21	4	24	49	4367
% Cars, PU, Vans	96.4	99.4	100.0	99.4	100.0	99.3	100.0	99.3	100.0	100.0	98.4	99.0	100.0	100.0	100.0	100.0	99.3
Heavy Trucks	2	10	0	12	0	17	0	17	0	0	1	1	0	0	0	0	30
%Heavy Trucks	3.6	0.6	0.0	0.6	0.0	0.7	0.0	0.7	0.0	0.0	1.6	1.0	0.0	0.0	0.0	0.0	0.7

Prepared by NDS/ATD

VOLUME

May Rd w/o Pleasant Hill Rd

Day: Thursday
Date: 2/4/2016

City: Duluth
Project #: GA16_9056_001

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	492	1,095	1,587

AM Period	NB		SB		EB		WB		TOTAL		PM Period	NB		SB		EB		WB		TOTAL	
00:00					0		0		0		12:00					6		14		20	
00:15					2		1		3		12:15					16		8		24	
00:30					0		1		1		12:30					7		16		23	
00:45					0	2	0	2	0	4	12:45					8	37	16	54	24	91
01:00					0		0		0		13:00					7		11		18	
01:15					0		0		0		13:15					12		11		23	
01:30					0		1		1		13:30					9		17		26	
01:45					0		0	1	0	1	13:45					11	39	7	46	18	85
02:00					0		0		0		14:00					8		13		21	
02:15					0		0		0		14:15					11		10		21	
02:30					0		2		2		14:30					5		17		22	
02:45					0		0	2	0	2	14:45					7	31	11	51	18	82
03:00					0		0		0		15:00					6		14		20	
03:15					0		0		0		15:15					12		14		26	
03:30					1		5		6		15:30					15		19		34	
03:45					0	1	3	8	3	9	15:45					8	41	13	60	21	101
04:00					0		3		3		16:00					11		6		17	
04:15					1		4		5		16:15					18		6		24	
04:30					1		7		8		16:30					10		17		27	
04:45					0	2	5	19	5	21	16:45					10	49	11	40	21	89
05:00					1		6		7		17:00					14		16		30	
05:15					0		9		9		17:15					18		8		26	
05:30					3		14		17		17:30					12		7		19	
05:45					3	7	22	51	25	58	17:45					14	58	8	39	22	97
06:00					4		20		24		18:00					11		4		15	
06:15					2		18		20		18:15					8		7		15	
06:30					7		21		28		18:30					10		10		20	
06:45					8	21	30	89	38	110	18:45					6	35	4	25	10	60
07:00					4		28		32		19:00					8		8		16	
07:15					9		42		51		19:15					9		9		18	
07:30					7		71		78		19:30					7		5		12	
07:45					3	23	58	199	61	222	19:45					1	25	3	25	4	50
08:00					10		47		57		20:00					3		4		7	
08:15					9		50		59		20:15					3		5		8	
08:30					8		45		53		20:30					2		3		5	
08:45					5	32	39	181	44	213	20:45					3	11	3	15	6	26
09:00					4		43		47		21:00					4		3		7	
09:15					5		21		26		21:15					4		2		6	
09:30					6		19		25		21:30					6		7		13	
09:45					2	17	13	96	15	113	21:45					1	15	1	13	2	28
10:00					5		8		13		22:00					2		1		3	
10:15					4		11		15		22:15					0		1		1	
10:30					4		8		12		22:30					0		2		2	
10:45					2	15	4	31	6	46	22:45					0	2	2	6	2	8
11:00					6		10		16		23:00					2		2		4	
11:15					7		9		16		23:15					1		1		2	
11:30					3		12		15		23:30					0		1		1	
11:45					10	26	7	38	17	64	23:45					0	3	0	4	0	7
TOTALS						146		717		863	TOTALS						346		378		724
SPLIT %						16.9%		83.1%		54.4%	SPLIT %						47.8%		52.2%		45.6%

DAILY TOTALS	NB	SB	EB	WB	Total
	0	0	492	1,095	1,587
			708	1311	2019

AM Peak Hour			11:45	07:30	07:30	PM Peak Hour			17:00	15:00	16:30
AM Pk Volume			39	226	255	PM Pk Volume			58	60	104
Pk Hr Factor			0.609	0.796	0.817	Pk Hr Factor			0.806	0.789	0.867
7 - 9 Volume	0	0	55	380	435	4 - 6 Volume	0	0	107	79	186
7 - 9 Peak Hour			08:00	07:30	07:30	4 - 6 Peak Hour			17:00	16:30	16:30
7 - 9 Pk Volume	0	0	32	226	255	4 - 6 Pk Volume	0	0	58	52	104
Pk Hr Factor	0.000	0.000	0.800	0.796	0.817	Pk Hr Factor	0.000	0.000	0.806	0.765	0.867

Prepared by National Data & Surveying Services

CLASSIFICATION

Pleasant Hill Rd S/o May Rd_Sunset St

Day: Thursday
Date: 2/4/2016

City: Duluth
Project #: GA16_9056_002

Summary

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	90	5	0	3	0	0	0	0	0	0	0	0	98
00:15	0	98	7	0	4	0	0	0	0	0	0	0	0	109
00:30	0	57	2	0	2	0	0	0	0	0	0	0	0	61
00:45	0	65	5	0	3	0	0	0	0	0	0	0	0	73
01:00	0	53	4	0	1	0	0	0	0	0	0	0	0	58
01:15	0	50	4	0	2	0	0	0	0	0	0	0	0	56
01:30	0	34	0	0	0	0	0	0	0	0	0	0	0	34
01:45	0	44	4	0	2	1	0	0	0	0	0	0	0	51
02:00	0	38	3	0	1	0	0	0	0	0	0	0	0	42
02:15	0	39	2	0	0	0	0	0	0	0	0	0	0	41
02:30	0	31	1	0	0	0	0	0	0	0	0	0	0	32
02:45	0	22	2	0	2	0	0	0	0	0	0	0	0	26
03:00	0	28	1	0	0	0	0	0	0	0	0	0	0	29
03:15	0	33	2	0	0	0	0	0	0	0	0	0	0	35
03:30	0	36	3	0	1	0	0	0	0	0	0	0	0	40
03:45	0	38	3	0	2	0	0	0	0	0	0	0	0	43
04:00	0	43	3	0	3	0	0	0	1	0	0	0	0	50
04:15	0	53	6	0	2	0	0	2	0	0	0	0	0	63
04:30	0	84	9	0	6	0	0	0	1	0	0	0	0	100
04:45	0	111	8	0	7	2	0	0	0	0	0	0	0	128
05:00	0	112	8	0	8	2	0	0	0	0	0	0	0	130
05:15	0	176	25	0	6	1	0	0	0	0	0	0	0	208
05:30	0	251	34	0	11	0	0	0	1	0	0	0	0	297
05:45	1	295	31	1	12	2	0	0	2	0	0	0	0	344
06:00	0	404	41	2	23	1	0	2	1	0	0	0	0	474
06:15	0	522	51	2	21	2	0	2	1	0	0	0	0	601
06:30	0	753	71	1	26	1	0	1	3	0	0	0	0	856
06:45	0	768	75	2	31	1	0	2	4	0	0	0	0	883
07:00	0	795	66	2	28	1	0	0	3	0	0	0	0	895
07:15	1	891	71	2	34	0	0	3	4	0	0	0	0	1006
07:30	0	881	83	2	38	3	0	3	4	0	0	0	0	1014
07:45	0	915	85	2	31	2	0	3	3	0	0	0	0	1041
08:00	1	838	75	4	43	0	0	4	5	0	0	0	0	970
08:15	0	978	89	3	39	2	0	7	2	0	0	0	0	1120
08:30	0	846	67	4	35	1	0	2	7	0	0	0	0	962
08:45	1	866	87	2	25	0	0	3	9	0	0	0	0	993
09:00	0	753	73	3	32	3	0	1	2	0	0	0	0	867
09:15	0	787	68	2	30	3	0	3	2	0	0	0	0	895
09:30	0	691	65	3	32	1	0	3	3	0	0	0	0	798
09:45	0	706	68	2	27	2	0	2	2	0	0	0	0	809
10:00	0	605	50	4	29	0	0	0	3	0	0	0	0	691
10:15	0	627	52	5	22	2	0	2	3	0	0	0	0	713
10:30	0	622	52	4	29	0	0	1	3	0	0	0	0	711
10:45	0	571	49	0	22	0	0	0	3	0	0	0	0	645
11:00	0	606	49	3	24	0	0	1	4	0	0	0	0	687
11:15	0	594	51	3	23	1	0	0	3	0	0	0	0	675
11:30	0	678	63	3	26	1	0	5	2	0	0	0	0	778
11:45	0	692	64	3	32	1	0	3	2	0	0	0	0	797
12:00 PM	0	687	56	3	30	1	0	1	1	0	0	0	0	779
12:15	0	667	69	3	27	1	0	2	2	0	0	0	0	771
12:30	0	690	65	2	41	1	0	1	2	0	0	0	0	802
12:45	0	683	63	3	23	3	0	3	5	0	0	0	0	783
13:00	0	775	59	5	29	1	0	2	3	0	0	0	0	874
13:15	0	738	59	2	28	1	0	4	2	0	0	0	0	834
13:30	0	680	70	3	31	1	0	2	2	0	0	0	0	789
13:45	0	709	68	5	29	1	0	1	4	0	0	0	0	817
14:00	0	728	59	5	29	2	0	1	3	0	0	0	0	827
14:15	0	803	68	2	30	3	0	6	2	0	0	0	0	914
14:30	0	787	73	2	34	0	0	0	4	0	0	0	0	900
14:45	1	801	78	4	29	1	0	2	1	0	0	0	0	917
15:00	0	819	78	2	33	1	0	5	2	0	0	0	0	940
15:15	0	843	80	3	31	2	0	1	2	0	0	0	0	962
15:30	0	844	81	2	27	1	0	2	1	0	0	0	0	958
15:45	1	831	67	4	30	5	0	2	2	0	0	0	0	942
16:00	1	806	63	3	28	0	0	1	3	0	0	0	0	905
16:15	0	956	82	3	35	0	0	3	3	0	0	0	0	1082
16:30	0	883	76	3	36	4	0	3	2	0	0	0	0	1007
16:45	0	984	76	3	30	2	0	3	5	0	0	0	0	1103
17:00	0	900	69	2	40	1	0	1	3	0	0	0	0	1016
17:15	1	942	67	2	32	1	0	1	6	0	0	0	0	1052
17:30	0	928	68	2	29	2	0	2	3	0	0	0	0	1034
17:45	0	895	72	2	33	1	0	1	5	0	0	0	0	1009
18:00	0	855	68	2	31	1	0	2	3	0	0	0	0	962
18:15	0	836	68	2	30	0	0	2	2	0	0	0	0	940
18:30	1	884	69	2	35	1	0	2	4	0	0	0	0	998
18:45	0	743	65	2	23	0	0	1	4	0	0	0	0	838
19:00	0	709	57	1	27	0	0	1	1	0	0	0	0	796
19:15	0	686	67	2	23	0	0	1	6	0	0	0	0	785
19:30	0	516	48	1	15	0	0	0	5	0	0	0	0	585
19:45	0	493	44	1	21	0	0	0	1	0	0	0	0	560
20:00	0	495	46	1	18	0	0	0	2	0	0	0	0	562
20:15	0	454	32	0	16	0	0	0	1	0	0	0	0	503
20:30	0	423	32	0	17	0	0	0	2	0	0	0	0	474
20:45	0	396	33	0	13	0	0	0	0	0	0	0	0	442
21:00	0	384	27	0	9	0	0	0	1	0	0	0	0	421
21:15	0	411	33	0	11	0	0	0	0	0	0	0	0	455
21:30	0	336	24	0	12	0	0	0	1	0	0	0	0	373
21:45	0	317	22	0	8	0	0	0	0	0	0	0	0	347
22:00	0	292	25	0	11	0	0	0	1	0	0	0	0	329
22:15	0	278	18	0	10	0	0	0	0	0	0	0	0	306
22:30	0	217	13	0	6	0	0	0	0	0	0	0	0	236
22:45	0	207	16	0	6	0	0	0	0	0	0	0	0	229
23:00	1	157	13	0	3	0	0	0	0	0	0	0	0	174
23:15	0	186	12	0	8	0	0	0	0	0	0	0	0	206
23:30	0	130	11	0	2	0	0	0	0	0	0	0	0	143
23:45	0	107	5	0	1	0	0	0	1	0	0	0	0	114
Totals	10	40161	4251	148	1880	74		114	186					55824
% of Totals	0%	88%	8%	0%	3%	0%		0%	0%					100%
AM Volumes	4	19270	1737	64	780	36	0	55	83	0	0	0	0	22029
% AM	0%	35%	3%	0%	1%	0%		0%	0%					39%
AM Peak Hour	07:15	07:30	07:30	09:45	07:30	09:00		07:30	08:00					07:30
Volume	2	3612	332	15	151	9		17	23					4145
PM Volumes	6	29891	2514	84	1100	38	0	59	103	0	0	0	0	33795
% PM	0%	54%	5%	0%	2%	0%		0%	0%					61%
PM Peak Hour	15:15	16:45	14:45	13:00	16:15	15:00		14:15	16:45					16:15
Volume	2	3754	317	15	141	9		13	17					4208

Directional Peak Periods	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
All Classes	Volume	%	Volume	%	Volume	%	Volume	%
	8001	14%	6449	12%	8208	15%	33166	59%

Classification Definitions

1 Motorcycles	**4** Buses	**7** >=4-Axle Single Units	**10** >=6-Axle Single Trailers	**13** >=7-Axle Multi-Trailers	
2 Passenger Cars	**5** 2-Axle, 6-Tire Single Units	**8** <=4-Axle Single Trailers	**11** <=5-Axle Multi-Trailers		
3 2-Axle, 4-Tire Single Units	**6** 3-Axle Single Units	**9** 5-Axle Single Trailers	**12** 6-Axle Multi-Trailers		

Prepared by National Data & Surveying Services

CLASSIFICATION

Buford Hwy/US 23 SB OffRamp @ Pleasant Hill Rd

Day: Thursday
Date: 2/4/2016

City: Duluth
Project #: GA16_9056_003e

East Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3
00:15	0	6	0	0	0	0	0	0	0	0	0	0	0	6
00:30	0	5	0	0	0	0	0	0	0	0	0	0	0	5
00:45	0	1	0	0	1	0	0	0	0	0	0	0	0	2
01:00	0	9	0	0	0	0	0	0	0	0	0	0	0	9
01:15	0	3	0	0	0	0	0	0	0	0	0	0	0	3
01:30	0	2	0	0	0	0	0	0	0	0	0	0	0	2
01:45	0	4	0	0	0	0	0	0	0	0	0	0	0	4
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30	0	1	0	0	0	1	0	0	0	0	0	0	0	2
02:45	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:15	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:30	0	3	2	0	0	0	0	0	0	0	0	0	0	5
03:45	0	3	1	0	0	0	0	0	0	0	0	0	0	4
04:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
04:15	0	1	1	0	1	0	0	0	0	0	0	0	0	3
04:30	0	4	0	0	0	0	0	0	0	0	0	0	0	4
04:45	0	9	0	0	0	1	0	0	0	0	0	0	0	10
05:00	0	5	0	0	0	1	0	0	1	0	0	0	0	7
05:15	0	3	1	0	0	0	0	0	0	0	0	0	0	4
05:30	0	7	2	0	0	0	0	0	1	0	0	0	0	10
05:45	0	12	4	0	1	0	0	0	0	0	0	0	0	17
06:00	0	14	5	0	2	2	0	0	1	0	0	0	0	24
06:15	0	20	6	0	1	3	0	0	0	0	0	0	0	30
06:30	0	15	7	0	2	0	0	0	3	0	0	0	0	27
06:45	0	43	7	5	1	1	0	0	3	0	0	0	0	60
07:00	0	56	6	6	4	1	0	0	1	0	0	0	0	74
07:15	0	64	9	2	4	1	0	0	2	0	0	0	0	82
07:30	0	72	5	1	1	2	0	0	5	0	0	0	0	86
07:45	0	58	9	4	2	0	0	2	1	0	0	0	0	76
08:00	0	55	6	1	7	0	0	0	4	0	0	0	0	73
08:15	1	52	5	1	3	0	0	0	1	0	0	0	0	63
08:30	0	53	12	1	3	1	0	0	3	0	0	0	0	73
08:45	0	49	7	2	3	0	0	0	1	0	0	0	0	62
09:00	0	37	9	0	4	0	0	2	0	0	0	0	0	52
09:15	0	42	9	1	2	0	0	0	3	0	0	0	0	57
09:30	0	41	15	1	3	0	0	0	0	0	0	0	0	60
09:45	0	49	14	1	1	1	0	0	2	0	0	0	0	68
10:00	0	45	14	0	4	0	0	0	3	0	0	0	0	66
10:15	0	45	7	1	3	0	0	0	0	0	0	0	0	56
10:30	0	43	5	1	3	0	0	1	2	0	0	0	0	55
10:45	0	47	7	1	3	0	0	0	3	0	0	0	0	61
11:00	0	47	10	0	3	0	0	0	2	0	0	0	0	62
11:15	0	36	11	0	1	0	0	0	1	0	0	0	0	49
11:30	0	62	5	0	4	0	0	0	3	0	0	0	0	74
11:45	0	58	6	1	6	0	0	1	3	0	0	0	0	75
12:00 PM	0	50	9	0	6	0	0	1	1	0	0	0	0	67
12:15	0	51	8	0	4	1	0	0	2	0	0	0	0	66
12:30	0	61	12	0	4	0	0	0	1	0	0	0	0	78
12:45	0	50	3	1	5	0	0	0	3	0	0	0	0	62
13:00	0	66	5	1	4	0	0	0	2	0	0	0	0	78
13:15	0	54	12	1	5	0	0	0	2	0	0	0	0	74
13:30	0	60	12	0	3	0	0	2	4	0	0	0	0	81
13:45	0	52	8	0	3	0	0	0	2	0	0	0	0	65
14:00	0	49	6	2	6	0	0	0	0	0	0	0	0	63
14:15	0	65	8	0	5	0	0	0	3	0	0	0	0	81
14:30	0	77	11	0	3	0	0	0	2	0	0	0	0	93
14:45	1	64	8	0	3	0	0	0	2	0	0	0	0	78
15:00	0	64	9	0	4	0	0	0	1	0	0	0	0	78
15:15	0	72	15	0	3	0	0	3	2	0	0	0	0	95
15:30	0	73	10	1	4	0	0	0	3	0	0	0	0	91
15:45	0	60	6	1	6	1	0	0	3	0	0	0	0	77
16:00	0	61	8	1	2	0	0	0	0	0	0	0	0	72
16:15	0	67	9	0	3	1	0	0	1	0	0	0	0	81
16:30	0	53	15	0	2	0	0	0	1	0	0	0	0	71
16:45	0	65	13	0	4	1	0	0	0	0	0	0	0	83
17:00	0	61	9	0	4	0	0	0	0	0	0	0	0	74
17:15	0	62	12	0	4	0	0	3	1	0	0	0	0	82
17:30	0	67	10	1	5	1	0	0	1	0	0	0	0	85
17:45	1	71	8	0	2	0	0	1	1	0	0	0	0	84
18:00	0	63	12	0	0	0	0	0	0	0	0	0	0	75
18:15	0	59	5	0	4	0	0	0	0	0	0	0	0	68
18:30	0	65	5	0	5	0	0	0	0	0	0	0	0	75
18:45	0	46	2	0	4	0	0	0	1	0	0	0	0	53
19:00	0	55	4	0	1	0	0	0	0	0	0	0	0	60
19:15	0	47	3	0	2	0	0	0	1	0	0	0	0	53
19:30	0	30	4	0	0	0	0	0	1	0	0	0	0	35
19:45	0	36	3	0	1	0	0	0	0	0	0	0	0	40
20:00	0	28	0	1	0	0	0	0	1	0	0	0	0	30
20:15	0	31	1	0	0	0	0	0	0	0	0	0	0	32
20:30	0	31	1	0	0	0	0	0	1	0	0	0	0	33
20:45	0	21	1	0	1	0	0	0	0	0	0	0	0	23
21:00	0	25	0	0	0	0	0	0	0	0	0	0	0	25
21:15	0	33	6	0	0	0	0	0	0	0	0	0	0	39
21:30	0	23	2	0	0	0	0	0	0	0	0	0	0	25
21:45	0	21	1	0	1	0	0	0	0	0	0	0	0	23
22:00	0	23	2	0	0	0	0	0	0	0	0	0	0	25
22:15	0	17	0	0	1	0	0	0	0	0	0	0	0	18
22:30	0	7	0	0	0	0	0	0	0	0	0	0	0	7
22:45	0	11	2	0	0	0	0	0	0	0	0	0	0	13
23:00	0	9	2	0	1	0	0	0	0	0	0	0	0	12
23:15	0	12	0	0	0	0	0	0	1	0	0	0	0	13
23:30	0	7	2	0	0	0	0	0	0	0	0	0	0	9
23:45	0	8	1	0	0	0	0	0	0	0	0	0	0	9
Totals	3	3377	492	40	188	20		16	93					4229
% of Totals	0%	80%	12%	1%	4%	0%		0%	2%					100%

AM Volumes	1	1194	207	30	73	15	0	6	49	0	0	0	0	1575
% AM	0%	28%	5%	1%	2%	0%		0%	1%					37%
AM Peak Hour	07:30	07:00	09:15	06:45	11:30	06:00		07:00	07:15					07:00
Volume	1	250	52	14	20	6		2	12					318
PM Volumes	2	2183	285	10	115	5	0	10	44	0	0	0	0	2654
% PM	0%	52%	7%	0%	3%	0%		0%	1%					63%
PM Peak Hour	14:00	14:30	16:30	12:30	12:00	15:30		17:00	12:45					14:30
Volume	1	277	49	3	19	2		4	11					344

Directional Peak Periods	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
All Classes	Volume	%	Volume	%	Volume	%	Volume	%
	589	14%	571	14%	632	15%	2437	58%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 >=4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by National Data & Surveying Services

CLASSIFICATION

Buford Hwy/US 23 NB OnRamp @ Pleasant Hill Rd

Day: Thursday
Date: 2/4/2016

City: Duluth
Project #: GA16_9056_004e

East Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	10	0	0	1	0	0	0	0	0	0	0	0	11
00:15	0	7	0	0	0	0	0	0	0	0	0	0	0	7
00:30	0	5	0	0	0	0	0	0	0	0	0	0	0	5
00:45	0	8	0	0	0	0	0	0	0	0	0	0	0	8
01:00	0	3	1	0	0	0	0	0	1	0	0	0	0	5
01:15	0	3	1	0	1	0	0	0	0	0	0	0	0	5
01:30	0	2	0	0	0	0	0	0	0	0	0	0	0	2
01:45	0	1	0	0	0	0	0	0	0	0	0	0	0	1
02:00	0	4	1	0	0	0	0	0	0	0	0	0	0	5
02:15	0	2	0	0	0	0	0	0	0	0	0	0	0	2
02:30	0	4	1	0	0	0	0	0	0	0	0	0	0	5
02:45	0	2	1	0	0	0	0	0	0	0	0	0	0	3
03:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
03:15	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:30	0	0	1	0	0	0	0	0	0	0	0	0	0	1
03:45	0	3	1	0	1	0	0	0	0	0	0	0	0	5
04:00	0	5	0	0	0	1	0	0	2	0	0	0	0	8
04:15	0	5	0	1	0	0	0	0	0	0	0	0	0	6
04:30	0	7	1	0	0	0	0	0	0	0	0	0	0	8
04:45	0	3	2	0	1	0	0	0	1	0	0	0	0	7
05:00	0	6	1	0	0	0	0	0	2	0	0	0	0	9
05:15	0	13	4	0	1	1	0	0	0	0	0	0	0	19
05:30	0	20	2	0	4	1	0	0	2	0	0	0	0	29
05:45	0	29	8	0	1	0	0	0	0	0	0	0	0	38
06:00	0	31	5	2	5	0	0	0	0	0	0	0	0	43
06:15	0	55	8	3	6	0	0	1	1	0	0	0	0	74
06:30	0	73	17	14	8	0	0	1	3	0	0	0	0	116
06:45	0	90	21	0	6	0	0	0	2	0	0	0	0	119
07:00	0	93	16	1	3	0	0	1	0	0	0	0	0	114
07:15	0	81	23	0	12	0	0	0	0	0	0	0	0	116
07:30	0	111	13	0	5	0	0	1	0	0	0	0	0	130
07:45	0	120	16	1	7	1	0	1	0	0	0	0	0	146
08:00	0	103	14	3	15	1	0	0	1	0	0	0	0	137
08:15	0	94	14	1	10	0	0	0	0	0	0	0	0	119
08:30	0	74	10	1	6	0	0	1	2	0	0	0	0	94
08:45	0	66	11	0	5	0	0	1	3	0	0	0	0	86
09:00	0	62	12	0	8	1	0	0	2	0	0	0	0	85
09:15	0	55	13	0	9	1	0	1	3	0	0	0	0	82
09:30	0	60	10	0	7	0	0	0	1	0	0	0	0	78
09:45	0	47	10	0	5	0	0	2	2	0	0	0	0	66
10:00	0	60	14	1	3	0	0	0	2	0	0	0	0	80
10:15	0	34	10	0	1	2	0	0	1	0	0	0	0	48
10:30	0	55	12	1	3	1	0	0	1	0	0	0	0	73
10:45	0	51	5	0	6	1	0	1	1	0	0	0	0	65
11:00	1	49	7	0	8	0	0	0	3	0	0	0	0	68
11:15	0	35	14	0	4	2	0	1	2	0	0	0	0	58
11:30	0	60	9	3	2	1	0	1	0	0	0	0	0	76
11:45	0	61	11	0	4	1	0	0	4	0	0	0	0	81
12:00 PM	0	50	12	1	3	0	0	0	2	0	0	0	0	68
12:15	0	58	13	0	9	1	0	0	2	0	0	0	0	83
12:30	0	61	10	1	7	3	0	0	3	0	0	0	0	85
12:45	0	51	3	2	4	1	0	0	3	0	0	0	0	64
13:00	0	66	16	0	1	3	0	1	3	0	0	0	0	90
13:15	0	60	6	3	4	0	0	0	1	0	0	0	0	74
13:30	0	71	14	5	9	3	0	0	3	0	0	0	0	105
13:45	0	64	8	1	5	2	0	1	2	0	0	0	0	83
14:00	0	59	14	0	6	1	0	1	4	0	0	0	0	85
14:15	0	78	13	0	4	2	0	0	0	0	0	0	0	97
14:30	0	75	8	0	4	0	0	1	4	0	0	0	0	92
14:45	0	78	12	0	2	1	0	0	0	0	0	0	0	93
15:00	0	73	8	1	4	0	0	1	1	0	0	0	0	88
15:15	0	48	14	0	3	0	0	1	5	0	0	0	0	71
15:30	0	67	12	0	5	0	0	1	3	0	0	0	0	88
15:45	0	84	11	1	3	1	0	0	1	0	0	0	0	101
16:00	0	85	17	0	3	0	0	0	0	0	0	0	0	105
16:15	0	76	14	1	3	0	0	0	4	0	0	0	0	98
16:30	0	70	11	0	5	1	0	0	0	0	0	0	0	87
16:45	0	70	7	0	3	1	0	0	2	0	0	0	0	83
17:00	0	85	15	0	1	0	0	0	0	0	0	0	0	101
17:15	0	87	8	0	3	0	0	0	0	0	0	0	0	98
17:30	0	81	6	0	1	0	0	0	2	0	0	0	0	90
17:45	0	80	6	0	2	1	0	2	1	0	0	0	0	92
18:00	0	85	8	0	2	3	0	0	0	0	0	0	0	98
18:15	0	72	4	0	1	0	0	0	1	0	0	0	0	78
18:30	0	68	6	0	5	0	0	0	3	0	0	0	0	82
18:45	0	63	4	0	1	0	0	0	0	0	0	0	0	68
19:00	0	50	4	0	1	0	0	0	0	0	0	0	0	55
19:15	0	58	3	0	2	0	0	0	0	0	0	0	0	63
19:30	0	60	4	0	4	0	0	0	1	0	0	0	0	69
19:45	0	39	4	0	3	0	0	0	0	0	0	0	0	46
20:00	0	56	5	0	4	0	0	0	0	0	0	0	0	65
20:15	0	38	4	0	1	0	0	0	0	0	0	0	0	43
20:30	0	30	6	0	2	0	0	0	0	0	0	0	0	38
20:45	0	28	2	0	2	0	0	0	0	0	0	0	0	32
21:00	0	38	1	0	1	0	0	0	0	0	0	0	0	40
21:15	0	29	3	0	0	0	0	0	0	0	0	0	0	32
21:30	0	26	2	0	1	0	0	0	0	0	0	0	0	29
21:45	0	26	3	0	0	0	0	0	0	0	0	0	0	29
22:00	0	20	3	0	1	0	0	0	0	0	0	0	0	24
22:15	0	23	0	0	2	0	0	0	0	0	0	0	0	25
22:30	0	19	2	0	2	0	0	0	0	0	0	0	0	23
22:45	0	18	2	0	0	0	0	0	0	0	0	0	0	20
23:00	0	9	0	0	0	0	0	0	0	0	0	0	0	9
23:15	0	10	0	0	0	0	0	0	0	0	0	0	0	10
23:30	0	7	0	0	0	0	0	0	0	0	0	0	0	7
23:45	0	12	1	0	0	0	0	0	0	0	0	0	0	13
Totals	1	4326	649	48	287	39		22	93					5465
% of Totals	0%	79%	12%	1%	5%	1%		0%	2%					100%

AM Volumes	1	1765	320	32	158	15	0	13	42	0	0	0	0	2346
% AM	0%	32%	6%	1%	3%	0%		0%	1%					43%
AM Peak Hour	10:15	07:30	06:30	05:45	07:15	11:45		06:15	11:45					07:30
Volume	1	428	77	19	39	5		3	11					532
PM Volumes	0	2561	329	16	129	24	0	9	51	0	0	0	0	3119
% PM		47%	6%	0%	2%	0%		0%	1%					57%
PM Peak Hour		17:00	15:15	12:45	13:15	12:15		13:45	12:15					15:30
Volume		333	54	10	24	8		3	11					392

Directional Peak Periods	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
All Classes	Volume	%	Volume	%	Volume	%	Volume	%
	942	17%	652	12%	754	14%	3117	57%

Classification Definitions

1 Motorcycles	**4** Buses	**7** >=4-Axle Single Units	**10** >=6-Axle Single Trailers	**13** >=7-Axle Multi-Trailers
2 Passenger Cars	**5** 2-Axle, 6-Tire Single Units	**8** <=4-Axle Single Trailers	**11** <=5-Axle Multi-Trailers	
3 2-Axle, 4-Tire Single Units	**6** 3-Axle Single Units	**9** 5-Axle Single Trailers	**12** 6-Axle Multi-Trailers	

Appendix B
GDOT Traffic Information and Calculations

2014 Traffic Factors

Monthly Factors

Factor Group	Functional_Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
01	Rural_Local_Coll	1.18	1.08	1	0.97	0.95	1	0.99	0.95	0.97	0.91	1.01	1.03
02	Rural_Minor_Art	1.15	1.04	1	0.99	0.98	0.99	1.01	0.98	0.98	0.93	0.98	1.01
03	Rural_Major_Art	1.16	1.05	1	0.99	0.97	0.96	0.98	0.99	1.00	0.94	0.98	1.01
04	Rural_I-75	1.17	1.14	0.91	0.95	1.01	0.92	0.87	1.08	1.14	0.99	0.98	0.95
05	Rural_I-85	1.22	1.17	1.05	0.99	0.95	0.92	0.88	0.95	1.03	1	0.97	0.97
06	Rural_Int	1.19	1.13	1.01	0.96	0.96	0.93	0.89	0.99	1.03	1	0.98	1.01
07	Sm_Urb_Local_Coll	1.11	1.03	0.95	0.95	0.96	1.01	1.04	0.98	0.98	0.99	1.02	1.01
08	Sm_Urb_Art	1.11	0.98	0.96	0.97	0.96	0.98	1	1	1.02	1	1.01	1.01
09	Sm_Urb/Urb_Freeways_Int (Not ATL)	1.13	1.05	0.97	0.96	0.98	0.96	0.97	0.99	1.03	0.98	1.01	1.01
10	Urb_Local_Coll	1.11	1.03	0.95	0.97	0.95	1	1.05	0.98	0.98	0.95	1.02	1.05
11	Urb_Minor_Art (Not ATL)	1.11	1	0.97	0.97	0.97	1	1.03	0.98	0.98	0.96	1.02	1.03
12	Urb_Major_Art (Not ATL)	1.13	1	0.97	0.97	0.97	0.98	1.01	0.98	1	0.98	1.03	1.03
13	Urb_Minor_Art_ATL	1.12	1.05	0.97	0.98	0.97	0.98	1.01	0.96	0.97	0.96	1.03	1.03
14	Urb_Major_Art_ATL	1.11	1.01	0.97	0.98	0.97	0.99	1.02	0.98	0.99	0.98	1.02	1.01
15	Urb_Freeways_Int_ATL	1.13	1.03	0.99	0.99	0.98	0.97	0.98	0.97	0.99	0.97	1.01	1
16	Urb_I-285	1.10	1.01	0.98	0.98	0.98	0.98	1	0.98	0.99	0.99	1.02	1.01

Daily Factors

Factor Group	Functional_Class	Mon	Tue	Wed	Thu	Fri	Sat	Sun
01	Rural_Local_Coll	1.01	1	0.98	0.96	0.88	1.03	1.20
02	Rural_Minor_Art	0.98	0.97	0.97	0.94	0.86	1.08	1.30
03	Rural_Major_Art	1.01	1	1	0.95	0.85	1.05	1.22
04	Rural_I-75	1.10	1.20	1.15	1.03	0.85	0.89	0.91
05	Rural_I-85	1.07	1.15	1.09	1.02	0.84	0.98	0.92
06	Rural_Int	1.06	1.11	1.13	1.05	0.83	0.97	0.93
07	Sm_Urb_Local_Coll	0.98	0.96	0.98	0.95	0.86	1.04	1.36
08	Sm_Urb_Art	1	0.99	0.99	0.95	0.83	1.05	1.30
09	Sm_Urb/Urb_Freeways_Int (Not ATL)	1	1.01	1	0.96	0.86	1.05	1.18
10	Urb_Local_Coll	0.95	0.92	0.92	0.92	0.89	1.19	1.39
11	Urb_Minor_Art (Not ATL)	0.96	0.93	0.94	0.92	0.86	1.13	1.44
12	Urb_Major_Art (Not ATL)	0.97	0.94	0.95	0.92	0.86	1.11	1.41
13	Urb_Minor_Art_ATL	0.96	0.93	0.94	0.93	0.88	1.12	1.41
14	Urb_Major_Art_ATL	0.99	0.95	0.96	0.93	0.88	1.06	1.34
15	Urb_Freeways_Int_ATL	0.99	0.99	0.97	0.95	0.90	1.05	1.21
16	Urb_I-285	0.98	0.96	0.94	0.92	0.90	1.10	1.33

2014 Traffic Factors

Axle Factors

Factor Group	Functional_Class	Axle Factor
01	Rural_Local_Coll	0.94
02	Rural_Minor_Art	0.90
03	Rural_Major_Art	0.88
04	Rural_I-75	0.77
05	Rural_I-85	0.77
06	Rural_Int	0.80
07	Sm_Urb_Local_Coll	0.98
08	Sm_Urb_Art	0.92
09	Sm_Urb/Urb_Freeways_Int (Not ATL)	0.88
10	Urb_Local_Coll	0.97
11	Urb_Minor_Art (Not ATL)	0.97
12	Urb_Major_Art (Not ATL)	0.97
13	Urb_Minor_Art_ATL	0.99
14	Urb_Major_Art_ATL	0.99
15	Urb_Freeways_Int_ATL	0.95
16	Urb_I-285	0.88

Growth Factors

Factor Group	Functional_Class	Growth Factor
01	Rural_Local_Coll	1
02	Rural_Minor_Art	1.01
03	Rural_Major_Art	1.02
04	Rural_I-75	1.05
05	Rural_I-85	1.04
06	Rural_Int	1.06
07	Sm_Urb_Local_Coll	0.97
08	Sm_Urb_Art	0.99
09	Sm_Urb/Urb_Freeways_Int (Not ATL)	1.02
10	Urb_Local_Coll	1.03
11	Urb_Minor_Art (Not ATL)	1.01
12	Urb_Major_Art (Not ATL)	0.99
13	Urb_Minor_Art_ATL	1.01
14	Urb_Major_Art_ATL	1.01
15	Urb_Freeways_Int_ATL	1.02
16	Urb_I-285	1.01

2012 Traffic Factors

Monthly Factors

Factor Group	Functional_Class	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
01	Rural_Local_Coll	1.06	1.01	0.95	0.98	0.97	1	1.03	1	0.99	0.96	1.01	1.06
02	Rural_Minor_Art	1.06	1.01	0.96	0.98	0.98	1	1.03	1	1	0.97	0.99	1.04
03	Rural_Major_Art	1.1	1.04	0.99	0.99	0.98	0.96	0.97	1	1.01	0.95	1	1.06
04	Rural_I-75	1.16	1.06	0.91	0.97	1	0.89	0.89	1.05	1.12	1.02	0.99	1.04
05	Rural_I-85	1.18	1.09	1.02	0.99	0.98	0.92	0.9	0.97	1.02	1.01	0.98	1
06	Rural_Int	1.19	1.09	0.98	0.95	0.97	0.9	0.89	1	1.05	1.01	1	1.04
07	Sm_Urb_Local_Coll	1.01	0.99	0.95	0.99	0.97	1.02	1.03	0.98	1	1	1.02	1.03
08	Sm_Urb_Art	1.06	0.98	0.96	0.99	0.98	0.99	1.01	1	1.02	1	1	1.02
09	Sm_Urb/Urb_Freeways_Int (Not ATL)	1.08	1.01	0.95	0.98	0.98	0.97	0.98	1.01	1.04	1	1	1.03
10	Urb_Local_Coll	1.04	0.99	0.95	0.98	0.97	1.02	1.05	0.99	1	0.97	1	1.05
11	Urb_Minor_Art (Not ATL)	1.03	0.95	0.95	0.98	0.98	1.02	1.06	0.99	1	0.99	1	1.06
12	Urb_Major_Art (Not ATL)	1.04	0.97	0.95	0.98	0.98	1	1.02	1	1.01	1	1.01	1.05
13	Urb_Minor_Art_ATL	1.07	1.01	0.96	0.99	0.97	0.99	1.02	0.98	0.99	0.98	1.01	1.05
14	Urb_Major_Art_ATL	1.05	1	0.96	0.99	0.97	0.99	1.02	0.99	1	0.99	1.01	1.05
15	Urb_Freeways_Int_ATL	1.07	1.02	0.97	0.99	0.98	0.97	0.99	0.99	1.01	0.99	1.01	1.03
16	Urb_I-285	1.06	1	0.97	0.99	0.96	0.97	0.99	1	1.02	1.01	1.01	1.04

Daily Factors

Factor Group	Functional_Class	Mon	Tue	Wed	Thu	Fri	Sat	Sun
01	Rural_Local_Coll	1	0.98	0.97	0.94	0.88	1.05	1.27
02	Rural_Minor_Art	0.99	0.97	0.96	0.93	0.87	1.07	1.3
03	Rural_Major_Art	1.02	1.01	1	0.95	0.85	1.03	1.21
04	Rural_I-75	1.09	1.12	1.08	0.98	0.85	0.95	0.99
05	Rural_I-85	1.07	1.1	1.07	0.99	0.84	0.99	0.99
06	Rural_Int	1.08	1.14	1.1	0.99	0.82	0.99	0.95
07	Sm_Urb_Local_Coll	0.98	0.97	0.93	0.93	0.89	1.12	1.27
08	Sm_Urb_Art	0.99	0.97	0.96	0.93	0.85	1.06	1.37
09	Sm_Urb/Urb_Freeways_Int (Not ATL)	1	0.99	0.98	0.93	0.86	1.08	1.24
10	Urb_Local_Coll	0.95	0.93	0.92	0.91	0.89	1.18	1.38
11	Urb_Minor_Art (Not ATL)	0.96	0.94	0.93	0.91	0.86	1.12	1.47
12	Urb_Major_Art (Not ATL)	0.98	0.94	0.94	0.92	0.86	1.1	1.46
13	Urb_Minor_Art_ATL	0.97	0.94	0.93	0.92	0.88	1.1	1.42
14	Urb_Major_Art_ATL	1	0.96	0.94	0.92	0.88	1.06	1.36
15	Urb_Freeways_Int_ATL	0.99	0.98	0.96	0.93	0.9	1.06	1.23
16	Urb_I-285	0.97	0.95	0.94	0.91	0.87	1.12	1.35

2012 Traffic Factors

Axle Factors

Factor Group	Functional_Class	Axle Factor
01	Rural_Local_Coll	0.97
02	Rural_Minor_Art	0.94
03	Rural_Major_Art	0.91
04	Rural_I-75	0.78
05	Rural_I-85	0.8
06	Rural_Int	0.78
07	Sm_Urb_Local_Coll	0.99
08	Sm_Urb_Art	0.96
09	Sm_Urb/Urb_Freeways_Int (Not ATL)	0.89
10	Urb_Local_Coll	0.99
11	Urb_Minor_Art (Not ATL)	0.98
12	Urb_Major_Art (Not ATL)	0.97
13	Urb_Minor_Art_ATL	0.98
14	Urb_Major_Art_ATL	0.99
15	Urb_Freeways_Int_ATL	0.94
16	Urb_I-285	0.87

Growth Factors

Factor Group	Functional_Class	Growth Factor
01	Rural_Local_Coll	0.99
02	Rural_Minor_Art	0.99
03	Rural_Major_Art	0.99
04	Rural_I-75	1.01
05	Rural_I-85	1.02
06	Rural_Int	1
07	Sm_Urb_Local_Coll	1.01
08	Sm_Urb_Art	1
09	Sm_Urb/Urb_Freeways_Int (Not ATL)	1
10	Urb_Local_Coll	1
11	Urb_Minor_Art (Not ATL)	0.98
12	Urb_Major_Art (Not ATL)	0.99
13	Urb_Minor_Art_ATL	0.99
14	Urb_Major_Art_ATL	1.02
15	Urb_Freeways_Int_ATL	1.01
16	Urb_I-285	0.98

About Station 1350416

Station ID	**1350416**	
County	Gwinnett	
City		
Road		
Road functional class	urban - Principal Arterial - Other	
Description		
Routes	Route Number	327300
	Concurrent Route Number	
	Concurrent Route 2	
	Concurrent Route 3	
LRS Section ID	1352327300 @ 0.000 Miles	
Traffic Segment	0 0.000 to 0.000 Miles	
Coordinate (Lat/Lon)	33.970800, -84.147700	
Map Reference		
Camera ID		

Volume

2015	-	
2014	44700	Est. from last year
2013	44680	Est. from last year
2012	44540	1 - 6 days
2011	29230	Est. from last year
2010	28950	Est. from last year
2009	28910	Est. from last year
2008	29380	1 - 6 days
2007	30610	1 - 6 days
2006	36170	1 - 6 days
2005	39690	1 - 6 days
2004	38820	Est. from last year
2003	38130	1 - 6 days
2002	39093	Est. from last year
2001	38100	1 - 6 days
2000	44100	Est. from last year
1999	42000	Est. from last year
1998	42900	1 - 6 days
1997	53700	1 - 6 days
1996	48000	1 - 6 days
1995	53700	1 - 6 days
1994	49800	1 - 6 days
1993	41800	1 - 6 days
1992	43105	1 - 6 days
1991	43375	1 - 6 days
1990	42572	1 - 6 days

Trucks

2015	-	
2014	1273	Est. from previous years
2013	1273	Est. from last year
2012	1269	1 - 6 days

Key Annual Trends

Year	Annual Average Daily Traffic	% APR Change	Annual Average Daily Truck Traffic	% Trucks	K Factor	D Factor	85th Pctl Speed
2015		3.45					
2014	44700		1273	2.85			
2013	44680		1273	2.85			
2012	44540		1269	2.85			
2011	29230						
2010	28950						
2009	28910						
2008	29380						
2007	30610						
2006	36170						
2005	39690						

Year	Month	Office Status	Summary	Volume By Hour	Class By Hour	Speed	Turning Movements	
2012	Sep	Count accepted	Summary | By Day	All | East | West	All | East | West	All | East | West		

Short Term Station 1350416

Georgia DOT

In Gwinnett County
Located on 327300
LRS ID: 1352327300

Survey Details

Survey ID	825
Survey Type	class
Year / Month	2012 Sep
Project ID	1.385E+12
Device ID	
Survey Duration	2 Days 0 hours
Notes	
Technician	
Survey Status (Office)	

Short Term Station 1350416

Georgia DOT

In Gwinnett County
Located on 327300
LRS ID: 1352327300

Daily Volumes

	day	E, 1	E, 2	W, 1	W, 2	Total	Dir Split	Actual hours
09/26/2012	Wed	23648	0	23631	0	47279	50.0 %	0
09/27/2012	Thu	24941	0	23857	0	48798	51.1 %	0
09/28/2012	Fri	359	0	355	0	714	50.3 %	0
Total		**48948**	**0**	**47843**	**0**	**96791**		
Days		**2**	**0**	**2**	**0**	**0**		
ADT		**24474**		**23922**				

Short Term Station 1350416

Georgia DOT

In Gwinnett County
Located on 327300
LRS ID: 1352327300

Volume By Hour

Direction: All Directions

Time	Wed Sep 26	Thu Sep 27	Fri Sep 28	Total	Avg	Pct
12:00 am		334	348	682	341	0.7
1:00 am		137	215	352	176	0.36
2:00 am		160	151	311	156	0.32
3:00 am	137	139		276	138	0.29
4:00 am	246	240		486	243	0.5
5:00 am	690	676		1366	683	1.41
6:00 am	2147	2198		4345	2172	4.49
7:00 am	3383	3451		6834	3417	7.06
8:00 am	3657	3529		7186	3593	7.42
9:00 am	2842	2725		5567	2784	5.75
10:00 am	2384	2466		4850	2425	5.01
11:00 am	2495	2459		4954	2477	5.12
12:00 pm	2669	2783		5452	2726	5.63
1:00 pm	2729	2857		5586	2793	5.77
2:00 pm	2879	3050		5929	2964	6.13
3:00 pm	3006	3117		6123	3062	6.33
4:00 pm	3576	3561		7137	3568	7.37
5:00 pm	3775	3787		7562	3781	7.81
6:00 pm	3485	3422		6907	3454	7.14
7:00 pm	2471	2634		5105	2552	5.27
8:00 pm	1728	1854		3582	1791	3.7
9:00 pm	1453	1605		3058	1529	3.16
10:00 pm	940	960		1900	950	1.96
11:00 pm	587	654		1241	620	1.28
Total	**47279**	**48798**	**714**	**96791**	**48395**	
SF	**0.999**	**0.999**	**0.999**			
DF	**0.942**	**0.924**	**0.885**			
AADT		**45044**			**45084**	

Short Term Station 1350416

Georgia DOT

In Gwinnett County
Located on 327300
LRS ID: 1352327300

Volume By Hour

Direction: East

Time	Wed Sep 26	Thu Sep 27	Fri Sep 28	Total	Avg	Pct
12:00 am		153	176	329	164	0.67
1:00 am		71	115	186	93	0.38
2:00 am		86	68	154	77	0.31
3:00 am	69	82		151	76	0.31
4:00 am	157	157		314	157	0.64
5:00 am	497	485		982	491	2.01
6:00 am	1578	1611		3189	1594	6.52
7:00 am	2238	2259		4497	2248	9.19
8:00 am	2258	2172		4430	2215	9.05
9:00 am	1588	1569		3157	1578	6.45
10:00 am	1192	1232		2424	1212	4.95
11:00 am	1135	1165		2300	1150	4.7
12:00 pm	1180	1342		2522	1261	5.15
1:00 pm	1372	1430		2802	1401	5.72
2:00 pm	1393	1528		2921	1460	5.97
3:00 pm	1249	1424		2673	1336	5.46
4:00 pm	1439	1506		2945	1472	6.02
5:00 pm	1581	1584		3165	1582	6.47
6:00 pm	1404	1456		2860	1430	5.84
7:00 pm	1004	1128		2132	1066	4.36
8:00 pm	905	928		1833	916	3.74
9:00 pm	734	825		1559	780	3.19
10:00 pm	423	464		887	444	1.81
11:00 pm	252	284		536	268	1.1
Total	**23648**	**24941**	**359**	**48948**	**24474**	
SF	**0.999**	**0.999**	**0.999**			
DF	**0.942**	**0.924**	**0.885**			
AADT		**23022**			**22797**	

Short Term Station 1350416

Georgia DOT

In Gwinnett County
Located on 327300
LRS ID: 1352327300

Volume By Hour

Direction: West

Time	Wed Sep 26	Thu Sep 27	Fri Sep 28	Total	Avg	Pct
12:00 am		181	172	353	176	0.74
1:00 am		66	100	166	83	0.35
2:00 am		74	83	157	78	0.33
3:00 am	68	57		125	62	0.26
4:00 am	89	83		172	86	0.36
5:00 am	193	191		384	192	0.8
6:00 am	569	587		1156	578	2.42
7:00 am	1145	1192		2337	1168	4.88
8:00 am	1399	1357		2756	1378	5.76
9:00 am	1254	1156		2410	1205	5.04
10:00 am	1192	1234		2426	1213	5.07
11:00 am	1360	1294		2654	1327	5.55
12:00 pm	1489	1441		2930	1465	6.12
1:00 pm	1357	1427		2784	1392	5.82
2:00 pm	1486	1522		3008	1504	6.29
3:00 pm	1757	1693		3450	1725	7.21
4:00 pm	2137	2055		4192	2096	8.76
5:00 pm	2194	2203		4397	2198	9.19
6:00 pm	2081	1966		4047	2024	8.46
7:00 pm	1467	1506		2973	1486	6.21
8:00 pm	823	926		1749	874	3.66
9:00 pm	719	780		1499	750	3.13
10:00 pm	517	496		1013	506	2.12
11:00 pm	335	370		705	352	1.47
Total	**23631**	**23857**	**355**	**47843**	**23921**	
SF	**0.999**	**0.999**	**0.999**			
DF	**0.942**	**0.924**	**0.885**			
AADT		**22022**			**22287**	

Short Term Station 1350416

Georgia DOT

In Gwinnett County
Located on 327300
LRS ID: 1352327300

Class By Hour

Direction: All Directions

Class	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Vol	Trucks	CU	% Tr	% CU
Wednesday Sep 26, 2012																				
03:00 AM	0	112	12	0	2	5	0	1	5	0	0	0	0	0	0	137	13	6	9.5	46.2
04:00 AM	0	194	28	0	12	1	0	2	8	1	0	0	0	0	0	246	24	11	9.8	45.8
05:00 AM	0	559	92	9	13	3	0	4	10	0	0	0	0	0	0	690	39	14	5.7	35.9
06:00 AM	10	1793	265	18	32	13	0	7	8	1	0	0	0	0	0	2147	79	16	3.7	20.3
07:00 AM	10	2872	416	6	49	7	0	10	9	0	0	0	4	0	0	3383	85	23	2.5	27.1
08:00 AM	7	3145	400	27	41	8	0	12	11	2	0	0	4	0	0	3657	105	29	2.9	27.6
09:00 AM	6	2368	355	25	57	6	0	11	10	2	0	0	2	0	0	2842	113	25	4	22.1
10:00 AM	6	1939	330	21	41	11	0	8	24	2	0	0	2	0	0	2384	109	36	4.6	33
11:00 AM	3	2047	340	20	50	9	0	10	16	0	0	0	0	0	0	2495	105	26	4.2	24.8
12:00 PM	5	2204	347	16	58	12	1	11	13	1	0	0	1	0	0	2669	113	26	4.2	23
13:00 PM	6	2242	371	23	45	10	1	14	16	1	0	0	0	0	0	2729	110	31	4	28.2
14:00 PM	3	2418	350	25	57	2	0	12	8	3	0	0	1	0	0	2879	108	24	3.8	22.2
15:00 PM	8	2536	358	23	50	8	0	5	14	2	0	0	2	0	0	3006	104	23	3.5	22.1
16:00 PM	5	3084	380	41	44	6	1	7	7	1	0	0	0	0	0	3576	107	15	3	14
17:00 PM	6	3372	349	5	23	4	1	6	9	0	0	0	0	0	0	3775	48	15	1.3	31.2
18:00 PM	12	3121	312	5	22	2	0	6	5	0	0	0	0	0	0	3485	40	11	1.1	27.5
19:00 PM	8	2204	226	3	13	1	0	7	8	0	0	0	1	0	0	2471	33	16	1.3	48.5
20:00 PM	3	1548	151	0	17	3	0	3	3	0	0	0	0	0	0	1728	26	6	1.5	23.1
21:00 PM	4	1319	115	0	9	3	0	1	2	0	0	0	0	0	0	1453	15	3	1	20
22:00 PM	1	847	88	0	3	0	0	0	1	0	0	0	0	0	0	940	4	1	0.4	25
23:00 PM	5	520	52	2	6	0	0	0	2	0	0	0	0	0	0	587	10	2	1.7	20
Daily Total	108	40444	5337	269	644	114	4	137	189	16	0	0	17	0	0	47279	1390	359	2.9	25.8
Thursday Sep 27, 2012																				
00:00 AM	1	306	24	0	2	0	0	0	1	0	0	0	0	0	0	334	3	1	0.9	33.3
01:00 AM	0	108	25	0	2	1	0	0	1	0	0	0	0	0	0	137	4	1	2.9	25
02:00 AM	0	142	11	1	0	0	0	1	5	0	0	0	0	0	0	160	7	6	4.4	85.7
03:00 AM	0	119	15	0	2	1	0	1	1	0	0	0	0	0	0	139	5	2	3.6	40
04:00 AM	0	187	28	2	6	4	0	2	10	0	0	0	1	0	0	240	25	13	10.4	52
05:00 AM	4	545	100	4	11	4	0	3	5	0	0	0	0	0	0	676	27	8	4	29.6
06:00 AM	4	1827	277	22	42	12	0	3	9	2	0	0	0	0	0	2198	90	14	4.1	15.6
07:00 AM	6	2995	364	13	45	8	2	10	6	1	0	0	1	0	0	3451	86	18	2.5	20.9
08:00 AM	8	3031	383	35	36	7	0	12	13	2	0	0	2	0	0	3529	107	29	3	27.1
09:00 AM	7	2245	369	18	48	10	0	8	17	1	0	0	2	0	0	2725	104	28	3.8	26.9
10:00 AM	8	1984	375	19	46	9	0	4	20	0	0	0	1	0	0	2466	99	25	4	25.3
11:00 AM	5	1991	347	16	43	14	1	14	24	2	0	0	2	0	0	2459	116	42	4.7	36.2
12:00 PM	6	2295	380	15	44	6	0	9	23	4	0	0	1	0	0	2783	102	37	3.7	36.3
13:00 PM	6	2362	394	11	51	8	0	7	14	2	0	0	2	0	0	2857	95	25	3.3	26.3
14:00 PM	6	2566	374	23	48	9	0	8	9	5	0	0	2	0	0	3050	104	24	3.4	23.1
15:00 PM	9	2624	395	15	44	9	1	7	13	0	0	0	0	0	0	3117	89	20	2.9	22.5
16:00 PM	9	3066	386	34	41	9	0	11	1	3	0	0	1	0	0	3561	100	16	2.8	16
17:00 PM	6	3365	360	3	37	3	0	9	1	0	0	0	3	0	0	3787	56	13	1.5	23.2
18:00 PM	9	3044	328	1	26	1	0	8	5	0	0	0	0	0	0	3422	41	13	1.2	31.7
19:00 PM	8	2346	244	7	14	1	0	6	4	2	1	0	1	0	0	2634	36	14	1.4	38.9
20:00 PM	2	1678	154	2	13	1	0	0	1	3	0	0	0	0	0	1854	20	4	1.1	20
21:00 PM	3	1464	124	1	8	1	0	1	3	0	0	0	0	0	0	1605	14	4	0.9	28.6
22:00 PM	4	870	77	0	6	0	0	1	1	1	0	0	0	0	0	960	9	3	0.9	33.3
23:00 PM	4	596	43	2	4	0	0	0	4	1	0	0	0	0	0	654	11	5	1.7	45.5
Daily Total	115	82200	10914	513	1263	232	8	262	380	45	1	0	36	0	0	48798	1350	365	2.8	27
Friday Sep 28, 2012																				
00:00 AM	0	310	32	1	3	0	0	0	1	1	0	0	0	0	0	348	6	2	1.7	33.3
01:00 AM	1	182	24	0	3	2	0	1	2	0	0	0	0	0	0	215	8	3	3.7	37.5
02:00 AM	0	128	18	0	3	0	0	0	2	0	0	0	0	0	0	151	5	2	3.3	40
Overall Total	**224**	**82820**	**10988**	**514**	**1272**	**234**	**8**	**263**	**385**	**46**	**1**	**0**	**36**	**0**	**0**	**96791**	**2759**	**731**	**2.9**	**26.5**
Pct. (%)	**0.2**	**86**	**11**	**0.5**	**1.3**	**0.2**	**0**	**0.3**	**0.4**	**0**	**0**	**0**	**0**	**0**	**0**					

Short Term Station 1350416

Georgia DOT

In Gwinnett County
Located on 327300
LRS ID: 1352327300

Key Annual Trends

Year	Annual Average Daily Traffic	% APR Change	Annual Average Daily Truck Traffic	% Trucks	K Factor	D Factor	85th Pctl Speed
2015		0.04					
2014	44700		1273	2.85			
2013	44680		1273	2.85			
2012	44540		1269	2.85			
2011	29230						
2010	28950						
2009	28910						
2008	29380						
2007	30610						
2006	36170						
2005	39690						

About Station 1350568

Station ID	**1350568**
County	Gwinnett
City	
Road	
Road functional class	urban - Principal Arterial - Other
Description	
Routes	Route Number: 327300 Concurrent Route Number: Concurrent Route 2: Concurrent Route 3:
LRS Section ID	1352327300 @ 0.000 Miles
Traffic Segment	0 0.000 to 0.000 Miles
Coordinate (Lat/Lon)	33.995300, -84.162500
Map Refer	
Camera ID	

Volume

2015	-	
2014	35700	Est. from last year
2013	35670	Est. from last year
2012	35560	Est. from last year
2011	34960	1 - 6 days
2010	31540	Est. from last year
2009	-	
2008	32560	Est. from last year
2007	32750	Est. from last year
2006	31610	1 - 6 days
2005	31880	1 - 6 days
2004	33750	1 - 6 days
2003	35300	1 - 6 days
2002	51614	Est. from last year
2001	50100	Est. from last year
2000	36300	Est. from last year
1999	35400	Est. from last year
1998	34900	1 - 6 days
1997	39100	1 - 6 days
1996	35000	1 - 6 days
1995	36100	1 - 6 days
1994	34100	1 - 6 days
1993	30100	1 - 6 days
1992	34154	1 - 6 days
1991	23883	1 - 6 days
1990	21760	1 - 6 days

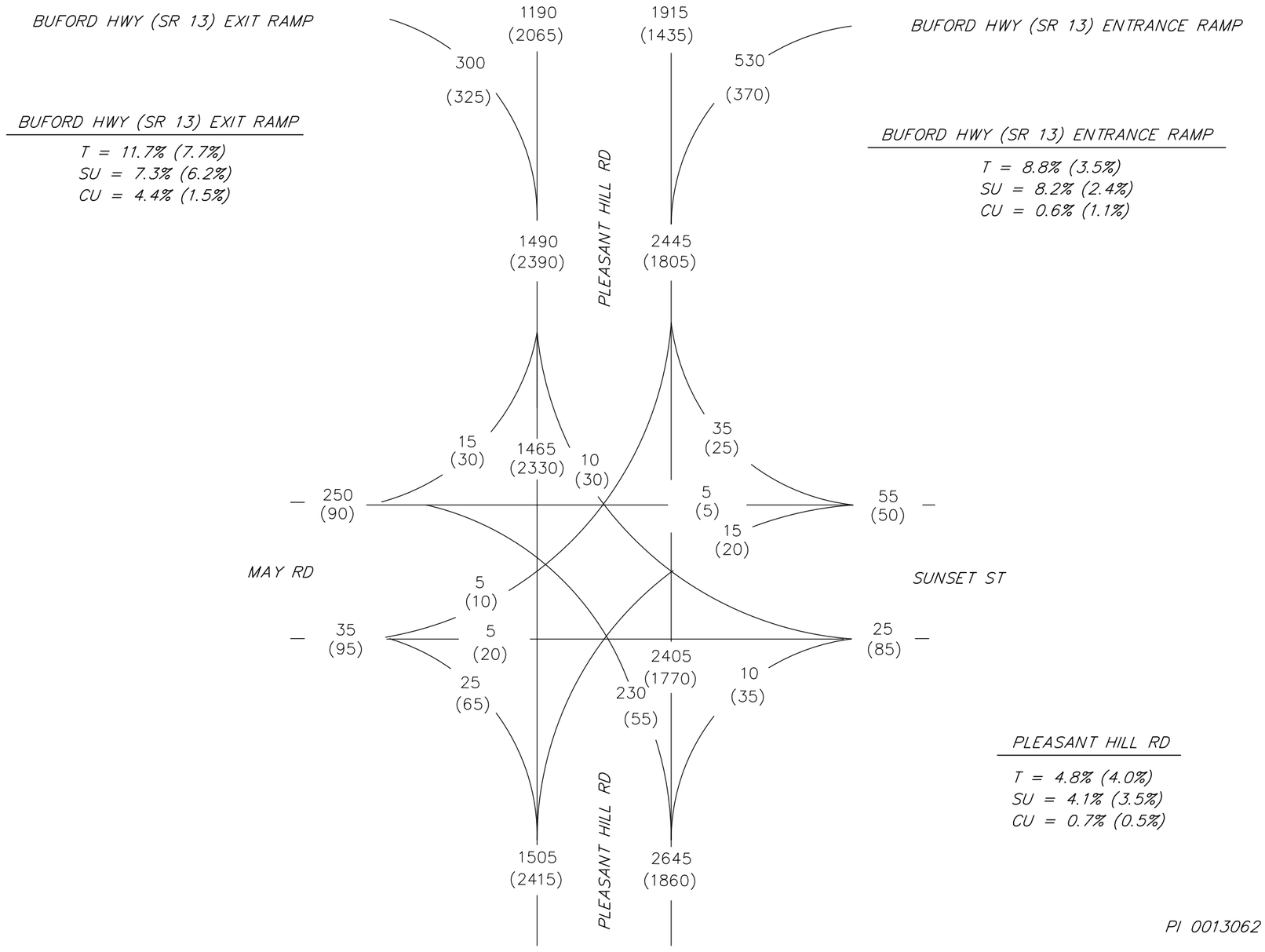
Trucks

2015	-	
2014	671	Est. from previous years
2013	671	Est. from last year
2012	-	
2011	657	1 - 6 days

Key Annual Trends

Year	Annual Average Daily Traffic	% APR Change	Annual Average Daily Truck Traffic	% Trucks	K Factor	D Factor	85th Pctl Speed
2015		3.45					
2014	35700		671	1.88			
2013	35670		671	1.88			
2012	35560						
2011	34960		657	1.88			
2010	31540						
2009							
2008	32560						
2007	32750						
2006	31610						
2005	31880						

Appendix C
Study Traffic Flow Diagrams
(Existing, No Build and Build)



BUFORD HWY (SR 13) EXIT RAMP

T = 11.7% (7.7%)
SU = 7.3% (6.2%)
CU = 4.4% (1.5%)

BUFORD HWY (SR 13) ENTRANCE RAMP

T = 8.8% (3.5%)
SU = 8.2% (2.4%)
CU = 0.6% (1.1%)

PLEASANT HILL RD

T = 4.8% (4.0%)
SU = 4.1% (3.5%)
CU = 0.7% (0.5%)

PI 0013062 GWINNETT COUNTY

07/15/2016

LEGEND

00 AM PEAK HOUR
(00) PM PEAK HOUR

EXISTING 2016 PEAK HOUR TRAFFIC

SEI
SOUTHEASTERN ENGINEERING, INC.
Civil, Structural, Traffic, Transportation, Land Surveying, Landscape Architecture, and Land Planning
2470 Sandy Plains Road Marietta, Georgia 30066
tel: 770-321-3936 fax: 770-321-3935
www.seengineering.com

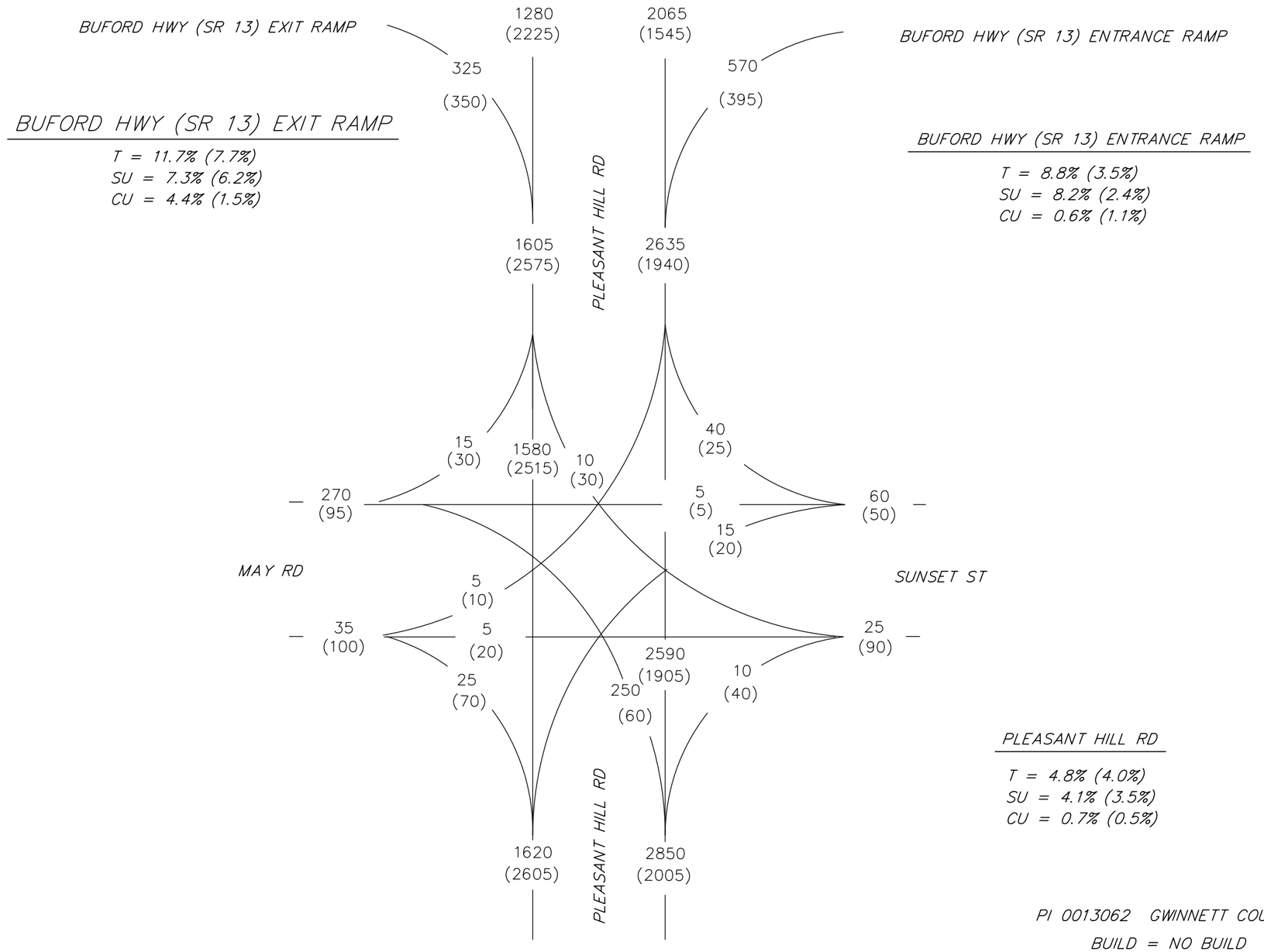
N.T.S.

REVISION DATES

TRAFFIC DIAGRAM
S.R. 13 AT PLEASANT HILL
INTERSECTION IMPROVEMENTS

		DATE:	
CHECKED:			
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No. 10-001



BUFORD HWY (SR 13) EXIT RAMP

T = 11.7% (7.7%)
SU = 7.3% (6.2%)
CU = 4.4% (1.5%)

BUFORD HWY (SR 13) ENTRANCE RAMP

T = 8.8% (3.5%)
SU = 8.2% (2.4%)
CU = 0.6% (1.1%)

PLEASANT HILL RD

T = 4.8% (4.0%)
SU = 4.1% (3.5%)
CU = 0.7% (0.5%)

PI 0013062 GWINNETT COUNTY
BUILD = NO BUILD

07/15/2016

LEGEND
00 AM PEAK HOUR
(00) PM PEAK HOUR

OPENING YEAR
2019 PEAK HOUR TRAFFIC

SEI
SOUTHEASTERN ENGINEERING, INC.
Civil, Structural, Traffic, Transportation, Land Surveying, Landscape Architecture, and Land Planning
2470 Sandy Plains Road Marietta, Georgia 30066
tel: 770-321-3936 fax: 770-321-3935
www.seengineering.com

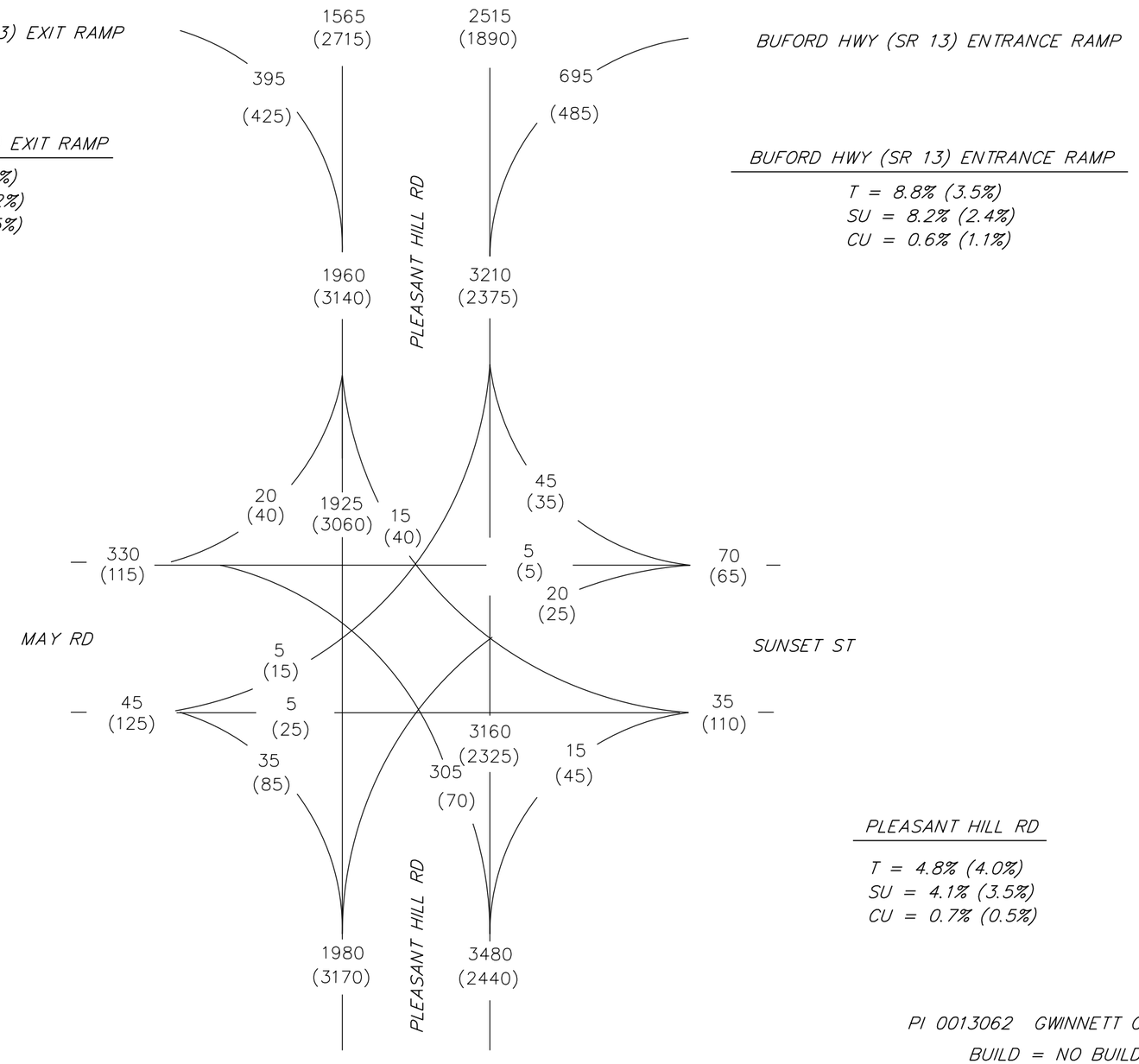
N.T.S.

REVISION DATES

TRAFFIC DIAGRAM
S.R. 13 AT PLEASANT HILL
INTERSECTION IMPROVEMENTS

		DATE:		DRAWING No.
CHECKED:		DATE:		10-002
BACKCHECKED:		DATE:		
CORRECTED:		DATE:		
VERIFIED:		DATE:		

7/31/2015 GPLN



BUFORD HWY (SR 13) EXIT RAMP

T = 11.7% (7.7%)
SU = 7.3% (6.2%)
CU = 4.4% (1.5%)

BUFORD HWY (SR 13) ENTRANCE RAMP

T = 8.8% (3.5%)
SU = 8.2% (2.4%)
CU = 0.6% (1.1%)

PLEASANT HILL RD

T = 4.8% (4.0%)
SU = 4.1% (3.5%)
CU = 0.7% (0.5%)

PI 0013062 GWINNETT COUNTY
BUILD = NO BUILD

07/15/2016

LEGEND

00 AM PEAK HOUR
(00) PM PEAK HOUR

DESIGN YEAR
2039 PEAK HOUR TRAFFIC

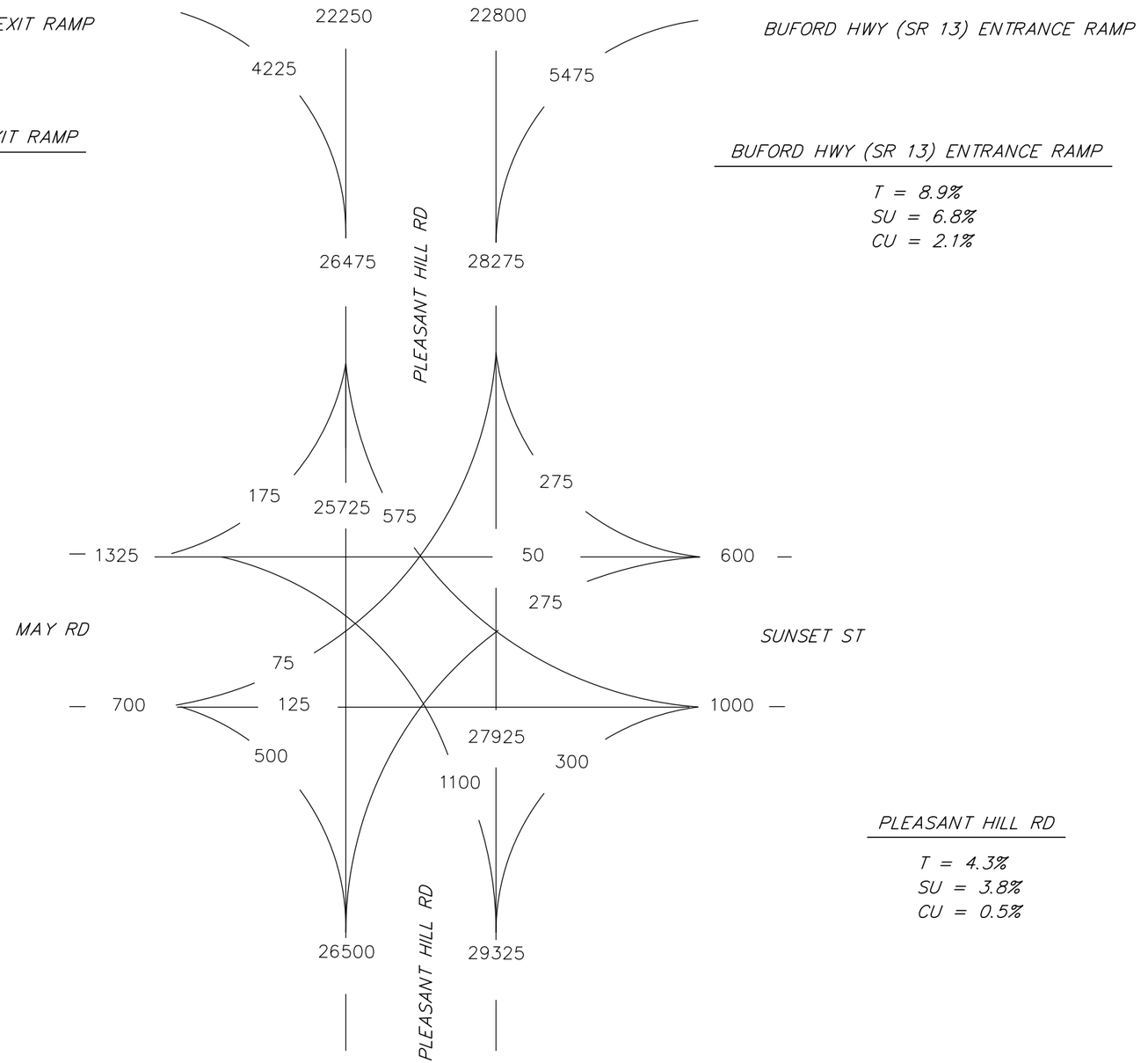
SEI
SOUTHEASTERN ENGINEERING, INC.
Civil, Structural, Traffic, Transportation, Land Surveying, Landscape Architecture, and Land Planning
2470 Sandy Plains Road Marietta, Georgia 30066
tel: 770-321-3936 fax: 770-321-3935
www.seengineering.com

N.T.S.

REVISION DATES

TRAFFIC DIAGRAM
S. R. 13 AT PLEASANT HILL
INTERSECTION IMPROVEMENTS

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		10-003
CORRECTED:		DATE:		
VERIFIED:		DATE:		



BUFORD HWY (SR 13) EXIT RAMP

BUFORD HWY (SR 13) EXIT RAMP

T = 8.4%
SU = 5.8%
CU = 2.6%

BUFORD HWY (SR 13) ENTRANCE RAMP

BUFORD HWY (SR 13) ENTRANCE RAMP

T = 8.9%
SU = 6.8%
CU = 2.1%

PLEASANT HILL RD

T = 4.3%
SU = 3.8%
CU = 0.5%

N

PI 0013062 GWINNETT COUNTY

07/15/2016

LEGEND

00 ADT VOLUME

2016 AVERAGE DAILY TRAFFIC

SEI
SOUTHEASTERN ENGINEERING, INC.
Civil, Structural, Traffic, Transportation, Land Surveying, Landscape Architecture, and Land Planning
2470 Sandy Plains Road Marrietta, Georgia 30066
tel: 770-321-3936 fax: 770-321-3935
www.seengineering.com

N.T.S.

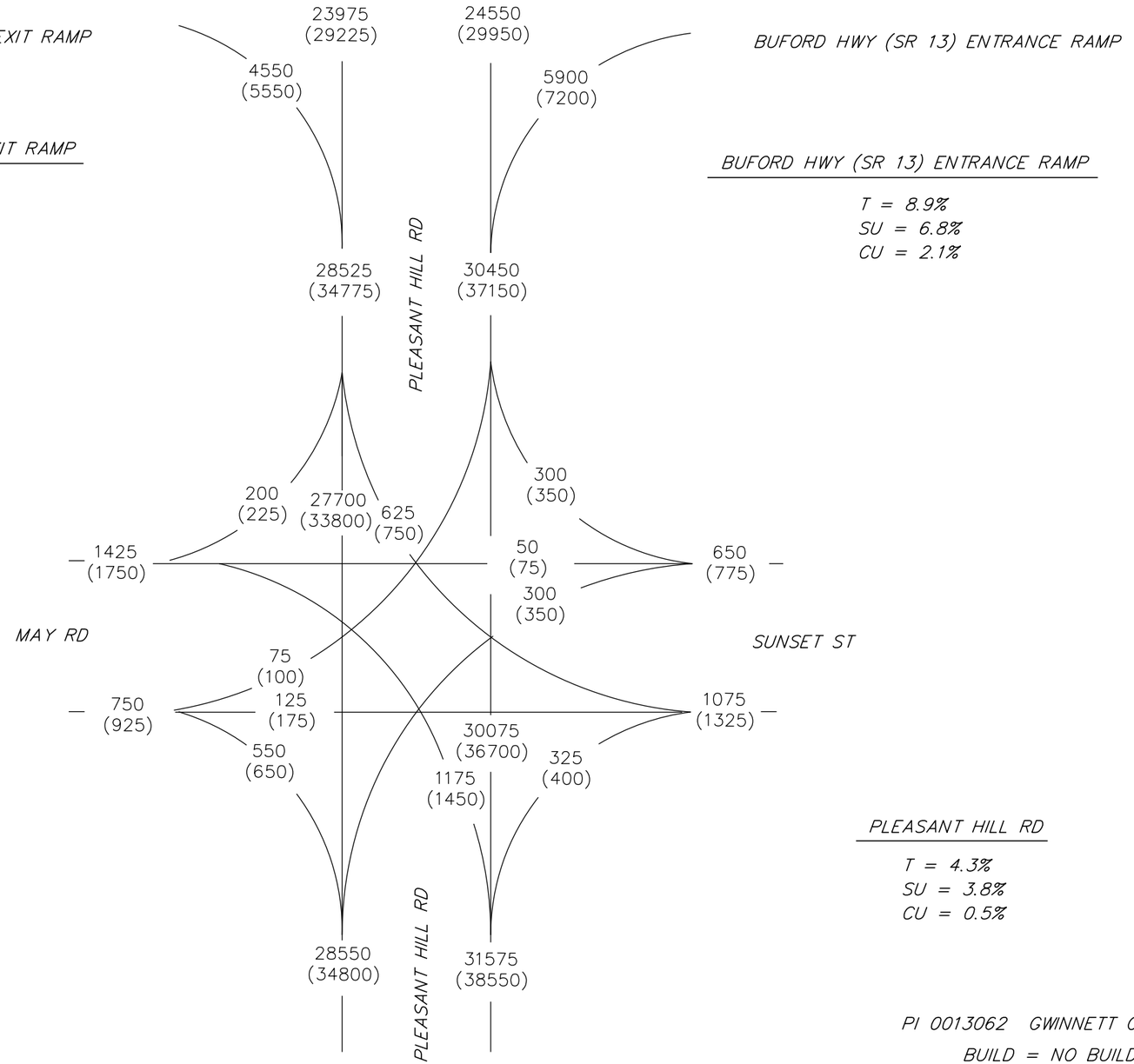
REVISION DATES

TRAFFIC DIAGRAM

S.R. 13 AT PLEASANT HILL
INTERSECTION IMPROVEMENTS

CHECKED:		DATE:		DRAWING No.
BACKCHECKED:		DATE:		10-004
CORRECTED:		DATE:		
VERIFIED:		DATE:		

7/31/2015 GPLN



BUFORD HWY (SR 13) EXIT RAMP

T = 8.4%
SU = 5.8%
CU = 2.6%

BUFORD HWY (SR 13) ENTRANCE RAMP

T = 8.9%
SU = 6.8%
CU = 2.1%

PLEASANT HILL RD

T = 4.3%
SU = 3.8%
CU = 0.5%

PI 0013062 GWINNETT COUNTY
BUILD = NO BUILD

07/15/2016

LEGEND

00 ADT VOLUME – 2019
(00) ADT VOLUME – 2039

OPENING & DESIGN YEARS
AVERAGE DAILY TRAFFIC

SOUTHEASTERN ENGINEERING, INC.
Civil, Structural, Traffic, Transportation, Land Surveying, Landscape Architecture, and Land Planning
2470 Sandy Plains Road Marietta, Georgia 30066
tel: 770-321-3936 fax: 770-321-3935
www.seengineering.com

N.T.S.

REVISION DATES

TRAFFIC DIAGRAM
S. R. 13 AT PLEASANT HILL
INTERSECTION IMPROVEMENTS

		DATE:	
CHECKED:		DATE:	
BACKCHECKED:		DATE:	
CORRECTED:		DATE:	
VERIFIED:		DATE:	

DRAWING No. 10-005

Appendix D
Synchro Outputs

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	5	25	15	5	35	10	1465	15	230	2405	10
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1863	1900	1863	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	5	5	27	16	5	38	11	1575	0	247	2586	11
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	2	2	2	2	5	5	5	5	5
Cap, veh/h	49	18	67	66	14	59	145	3305	0	355	3695	16
Arrive On Green	0.06	0.06	0.06	0.06	0.06	0.06	0.01	0.67	0.00	0.07	0.73	0.73
Sat Flow, veh/h	127	309	1177	329	246	1041	1774	5103	0	1723	5078	22
Grp Volume(v), veh/h	37	0	0	59	0	0	11	1575	0	247	1677	920
Grp Sat Flow(s),veh/h/ln	1613	0	0	1616	0	0	1774	1647	0	1723	1647	1806
Q Serve(g_s), s	0.0	0.0	0.0	1.2	0.0	0.0	0.2	15.1	0.0	4.2	27.5	27.6
Cycle Q Clear(g_c), s	2.2	0.0	0.0	3.4	0.0	0.0	0.2	15.1	0.0	4.2	27.5	27.6
Prop In Lane	0.14		0.73	0.27		0.64	1.00		0.00	1.00		0.01
Lane Grp Cap(c), veh/h	133	0	0	139	0	0	145	3305	0	355	2397	1314
V/C Ratio(X)	0.28	0.00	0.00	0.43	0.00	0.00	0.08	0.48	0.00	0.70	0.70	0.70
Avail Cap(c_a), veh/h	738	0	0	745	0	0	217	3305	0	660	2397	1314
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.4	0.0	0.0	45.0	0.0	0.0	7.7	7.8	0.0	9.6	7.4	7.4
Incr Delay (d2), s/veh	1.1	0.0	0.0	2.1	0.0	0.0	0.2	0.5	0.0	2.5	1.7	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	1.6	0.0	0.0	0.1	6.9	0.0	4.8	12.9	14.7
LnGrp Delay(d),s/veh	45.5	0.0	0.0	47.0	0.0	0.0	8.0	8.3	0.0	12.0	9.1	10.5
LnGrp LOS	D			D			A	A		B	A	B
Approach Vol, veh/h		37			59			1586			2844	
Approach Delay, s/veh		45.5			47.0			8.3			9.8	
Approach LOS		D			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.0	78.0		11.5	13.8	72.3		11.5
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	71.0		44.0	24.0	52.0		44.0
Max Q Clear Time (g_c+I1), s	2.2	29.6		4.2	6.2	17.1		5.4
Green Ext Time (p_c), s	0.0	39.1		0.6	0.6	33.2		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	10.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	10	20	65	20	5	25	30	2330	30	55	1770	35
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1827	1900	1863	1828	1900
Adj Flow Rate, veh/h	11	21	68	21	5	26	32	2453	0	58	1863	37
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	4	2	4	4
Cap, veh/h	44	36	94	86	30	71	233	3535	0	175	3605	72
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.02	0.71	0.00	0.03	0.72	0.72
Sat Flow, veh/h	100	422	1109	481	355	836	1774	5153	0	1774	5036	100
Grp Volume(v), veh/h	100	0	0	52	0	0	32	2453	0	58	1230	670
Grp Sat Flow(s),veh/h/ln	1631	0	0	1671	0	0	1774	1663	0	1774	1663	1810
Q Serve(g_s), s	2.5	0.0	0.0	0.0	0.0	0.0	0.6	31.9	0.0	1.0	18.9	18.9
Cycle Q Clear(g_c), s	6.7	0.0	0.0	3.2	0.0	0.0	0.6	31.9	0.0	1.0	18.9	18.9
Prop In Lane	0.11		0.68	0.40		0.50	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	174	0	0	187	0	0	233	3535	0	175	2381	1295
V/C Ratio(X)	0.57	0.00	0.00	0.28	0.00	0.00	0.14	0.69	0.00	0.33	0.52	0.52
Avail Cap(c_a), veh/h	662	0	0	635	0	0	272	3535	0	232	2381	1295
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	0.0	0.0	48.8	0.0	0.0	5.8	9.5	0.0	11.8	7.3	7.3
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.8	0.0	0.0	0.3	1.1	0.0	1.1	0.8	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0	1.6	0.0	0.0	0.3	14.7	0.0	0.9	8.8	9.8
LnGrp Delay(d),s/veh	53.4	0.0	0.0	49.6	0.0	0.0	6.1	10.6	0.0	12.9	8.1	8.7
LnGrp LOS	D			D			A	B		B	A	A
Approach Vol, veh/h		100			52			2485			1958	
Approach Delay, s/veh		53.4			49.6			10.5			8.4	
Approach LOS		D			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.5	88.0		15.6	10.4	87.2		15.6
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	81.0		44.0	7.0	79.0		44.0
Max Q Clear Time (g_c+I1), s	2.6	20.9		8.7	3.0	33.9		5.2
Green Ext Time (p_c), s	0.0	56.5		1.0	0.0	43.0		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	11.0
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	5	25	15	5	40	10	1580	15	250	2590	10
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1863	1900	1863	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	5	5	27	16	5	43	11	1699	0	269	2785	11
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	2	2	2	2	5	5	5	5	5
Cap, veh/h	48	19	71	63	14	65	129	3296	0	335	3704	15
Arrive On Green	0.06	0.06	0.06	0.06	0.06	0.06	0.01	0.67	0.00	0.07	0.73	0.73
Sat Flow, veh/h	120	315	1177	290	236	1078	1774	5103	0	1723	5080	20
Grp Volume(v), veh/h	37	0	0	64	0	0	11	1699	0	269	1805	991
Grp Sat Flow(s),veh/h/ln	1612	0	0	1605	0	0	1774	1647	0	1723	1647	1806
Q Serve(g_s), s	0.0	0.0	0.0	1.6	0.0	0.0	0.2	17.5	0.0	4.6	32.9	33.0
Cycle Q Clear(g_c), s	2.2	0.0	0.0	3.8	0.0	0.0	0.2	17.5	0.0	4.6	32.9	33.0
Prop In Lane	0.14		0.73	0.25		0.67	1.00		0.00	1.00		0.01
Lane Grp Cap(c), veh/h	138	0	0	142	0	0	129	3296	0	335	2402	1317
V/C Ratio(X)	0.27	0.00	0.00	0.45	0.00	0.00	0.08	0.52	0.00	0.80	0.75	0.75
Avail Cap(c_a), veh/h	689	0	0	696	0	0	199	3296	0	623	2402	1317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.2	0.0	0.0	45.9	0.0	0.0	9.3	8.5	0.0	14.1	8.1	8.1
Incr Delay (d2), s/veh	1.0	0.0	0.0	2.2	0.0	0.0	0.3	0.6	0.0	4.5	2.2	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	1.8	0.0	0.0	0.1	8.0	0.0	5.5	15.3	17.7
LnGrp Delay(d),s/veh	46.2	0.0	0.0	48.2	0.0	0.0	9.5	9.0	0.0	18.7	10.3	12.2
LnGrp LOS	D			D			A	A		B	B	B
Approach Vol, veh/h		37			64			1710			3065	
Approach Delay, s/veh		46.2			48.2			9.0			11.7	
Approach LOS		D			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.1	80.0		12.1	14.3	73.8		12.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	73.0		42.0	24.0	54.0		42.0
Max Q Clear Time (g_c+I1), s	2.2	35.0		4.2	6.6	19.5		5.8
Green Ext Time (p_c), s	0.0	36.8		0.6	0.7	33.5		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	11.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	10	20	70	20	5	25	30	2515	30	60	1905	40
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1827	1900	1863	1828	1900
Adj Flow Rate, veh/h	11	21	74	21	5	26	32	2647	0	63	2005	42
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	4	2	4	4
Cap, veh/h	43	36	101	87	31	73	210	3515	0	159	3584	75
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.02	0.70	0.00	0.03	0.71	0.71
Sat Flow, veh/h	92	399	1137	477	345	821	1774	5153	0	1774	5030	105
Grp Volume(v), veh/h	106	0	0	52	0	0	32	2647	0	63	1325	722
Grp Sat Flow(s),veh/h/ln	1629	0	0	1643	0	0	1774	1663	0	1774	1663	1809
Q Serve(g_s), s	2.6	0.0	0.0	0.0	0.0	0.0	0.6	38.0	0.0	1.1	21.6	21.7
Cycle Q Clear(g_c), s	7.2	0.0	0.0	3.2	0.0	0.0	0.6	38.0	0.0	1.1	21.6	21.7
Prop In Lane	0.10		0.70	0.40		0.50	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	180	0	0	191	0	0	210	3515	0	159	2370	1289
V/C Ratio(X)	0.59	0.00	0.00	0.27	0.00	0.00	0.15	0.75	0.00	0.40	0.56	0.56
Avail Cap(c_a), veh/h	658	0	0	630	0	0	248	3515	0	214	2370	1289
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	0.0	0.0	48.6	0.0	0.0	6.6	10.6	0.0	18.4	7.8	7.8
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.8	0.0	0.0	0.3	1.5	0.0	1.6	1.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	0.0	1.6	0.0	0.0	0.3	17.7	0.0	1.5	10.1	11.3
LnGrp Delay(d),s/veh	53.4	0.0	0.0	49.4	0.0	0.0	6.9	12.1	0.0	20.0	8.8	9.6
LnGrp LOS	D			D			A	B		B	A	A
Approach Vol, veh/h		106			52			2679			2110	
Approach Delay, s/veh		53.4			49.4			12.1			9.4	
Approach LOS		D			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.5	88.0		16.1	10.5	87.1		16.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	81.0		44.0	7.0	79.0		44.0
Max Q Clear Time (g_c+I1), s	2.6	23.7		9.2	3.1	40.0		5.2
Green Ext Time (p_c), s	0.0	55.4		1.0	0.0	38.1		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	5	35	20	5	45	15	1925	20	305	3160	15
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1863	1900	1863	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	5	5	38	22	5	48	16	2070	0	328	3398	16
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	2	2	2	2	5	5	5	5	5
Cap, veh/h	46	17	88	71	16	72	105	2925	0	366	3627	17
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.01	0.59	0.00	0.14	0.71	0.71
Sat Flow, veh/h	85	248	1264	354	228	1033	1774	5103	0	1723	5075	24
Grp Volume(v), veh/h	48	0	0	75	0	0	16	2070	0	328	2203	1211
Grp Sat Flow(s),veh/h/ln	1597	0	0	1615	0	0	1774	1647	0	1723	1647	1806
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	0.4	29.2	0.0	10.9	57.3	57.7
Cycle Q Clear(g_c), s	2.9	0.0	0.0	4.4	0.0	0.0	0.4	29.2	0.0	10.9	57.3	57.7
Prop In Lane	0.10		0.79	0.29		0.64	1.00		0.00	1.00		0.01
Lane Grp Cap(c), veh/h	151	0	0	159	0	0	105	2925	0	366	2354	1290
V/C Ratio(X)	0.32	0.00	0.00	0.47	0.00	0.00	0.15	0.71	0.00	0.90	0.94	0.94
Avail Cap(c_a), veh/h	724	0	0	728	0	0	169	2925	0	547	2354	1290
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.3	0.0	0.0	45.0	0.0	0.0	22.3	14.2	0.0	27.0	12.2	12.3
Incr Delay (d2), s/veh	1.2	0.0	0.0	2.2	0.0	0.0	0.7	1.5	0.0	12.4	8.6	14.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	2.1	0.0	0.0	0.3	13.6	0.0	10.0	28.2	33.3
LnGrp Delay(d),s/veh	45.5	0.0	0.0	47.1	0.0	0.0	23.0	15.7	0.0	39.4	20.8	26.3
LnGrp LOS	D			D			C	B		D	C	C
Approach Vol, veh/h		48			75			2086			3742	
Approach Delay, s/veh		45.5			47.1			15.7			24.2	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.4	78.0		12.9	20.6	65.8		12.9
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	71.0		44.0	24.0	52.0		44.0
Max Q Clear Time (g_c+I1), s	2.4	59.7		4.9	12.9	31.2		6.4
Green Ext Time (p_c), s	0.0	11.3		0.8	0.7	20.7		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	21.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	15	25	85	25	5	35	40	3060	40	70	2325	45
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1827	1900	1863	1828	1900
Adj Flow Rate, veh/h	16	26	89	26	5	37	42	3221	0	74	2447	47
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	4	2	4	4
Cap, veh/h	36	39	108	67	22	71	150	3800	0	104	3853	74
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.02	0.76	0.00	0.02	0.76	0.76
Sat Flow, veh/h	128	402	1122	388	227	734	1774	5153	0	1774	5040	97
Grp Volume(v), veh/h	131	0	0	68	0	0	42	3221	0	74	1612	882
Grp Sat Flow(s),veh/h/ln	1651	0	0	1349	0	0	1774	1663	0	1774	1663	1811
Q Serve(g_s), s	5.2	0.0	0.0	0.0	0.0	0.0	0.9	72.9	0.0	1.6	37.2	37.6
Cycle Q Clear(g_c), s	13.0	0.0	0.0	7.7	0.0	0.0	0.9	72.9	0.0	1.6	37.2	37.6
Prop In Lane	0.12		0.68	0.38		0.54	1.00		0.00	1.00		0.05
Lane Grp Cap(c), veh/h	183	0	0	159	0	0	150	3800	0	104	2543	1384
V/C Ratio(X)	0.72	0.00	0.00	0.43	0.00	0.00	0.28	0.85	0.00	0.71	0.63	0.64
Avail Cap(c_a), veh/h	372	0	0	332	0	0	188	3800	0	127	2543	1384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	74.4	0.0	0.0	71.8	0.0	0.0	10.1	13.5	0.0	45.1	9.0	9.1
Incr Delay (d2), s/veh	5.2	0.0	0.0	1.8	0.0	0.0	1.0	2.5	0.0	13.2	1.2	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	0.0	3.1	0.0	0.0	0.7	34.0	0.0	3.0	17.2	19.5
LnGrp Delay(d),s/veh	79.6	0.0	0.0	73.6	0.0	0.0	11.1	16.0	0.0	58.3	10.3	11.3
LnGrp LOS	E			E			B	B		E	B	B
Approach Vol, veh/h		131			68			3263			2568	
Approach Delay, s/veh		79.6			73.6			15.9			12.0	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.4	135.4		22.1	10.9	135.0		22.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	7.0	127.0		36.0	6.0	128.0		36.0
Max Q Clear Time (g_c+I1), s	2.9	39.6		15.0	3.6	74.9		9.7
Green Ext Time (p_c), s	0.0	86.7		1.2	0.0	52.8		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	16.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	5	25	15	5	40	10	1580	15	250	2590	10
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1863	1900	1863	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	5	5	27	16	5	43	11	1699	0	269	2785	11
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	2	2	2	2	5	5	5	5	5
Cap, veh/h	48	19	71	63	14	65	129	3296	0	335	3704	15
Arrive On Green	0.06	0.06	0.06	0.06	0.06	0.06	0.01	0.67	0.00	0.07	0.73	0.73
Sat Flow, veh/h	120	315	1177	290	236	1078	1774	5103	0	1723	5080	20
Grp Volume(v), veh/h	37	0	0	64	0	0	11	1699	0	269	1805	991
Grp Sat Flow(s),veh/h/ln	1612	0	0	1605	0	0	1774	1647	0	1723	1647	1806
Q Serve(g_s), s	0.0	0.0	0.0	1.6	0.0	0.0	0.2	17.5	0.0	4.6	32.9	33.0
Cycle Q Clear(g_c), s	2.2	0.0	0.0	3.8	0.0	0.0	0.2	17.5	0.0	4.6	32.9	33.0
Prop In Lane	0.14		0.73	0.25		0.67	1.00		0.00	1.00		0.01
Lane Grp Cap(c), veh/h	138	0	0	142	0	0	129	3296	0	335	2402	1317
V/C Ratio(X)	0.27	0.00	0.00	0.45	0.00	0.00	0.08	0.52	0.00	0.80	0.75	0.75
Avail Cap(c_a), veh/h	689	0	0	696	0	0	199	3296	0	623	2402	1317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.2	0.0	0.0	45.9	0.0	0.0	9.3	8.5	0.0	14.1	8.1	8.1
Incr Delay (d2), s/veh	1.0	0.0	0.0	2.2	0.0	0.0	0.3	0.6	0.0	4.5	2.2	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	1.8	0.0	0.0	0.1	8.0	0.0	5.5	15.3	17.7
LnGrp Delay(d),s/veh	46.2	0.0	0.0	48.2	0.0	0.0	9.5	9.0	0.0	18.7	10.3	12.2
LnGrp LOS	D			D			A	A		B	B	B
Approach Vol, veh/h		37			64			1710			3065	
Approach Delay, s/veh		46.2			48.2			9.0			11.7	
Approach LOS		D			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.1	80.0		12.1	14.3	73.8		12.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	73.0		42.0	24.0	54.0		42.0
Max Q Clear Time (g_c+I1), s	2.2	35.0		4.2	6.6	19.5		5.8
Green Ext Time (p_c), s	0.0	36.8		0.6	0.7	33.5		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	11.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	10	20	70	20	5	25	30	2515	30	60	1905	40
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1827	1900	1863	1828	1900
Adj Flow Rate, veh/h	11	21	74	21	5	26	32	2647	0	63	2005	42
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	4	2	4	4
Cap, veh/h	43	36	101	87	31	73	210	3515	0	159	3584	75
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.02	0.70	0.00	0.03	0.71	0.71
Sat Flow, veh/h	92	399	1137	477	345	821	1774	5153	0	1774	5030	105
Grp Volume(v), veh/h	106	0	0	52	0	0	32	2647	0	63	1325	722
Grp Sat Flow(s),veh/h/ln	1629	0	0	1643	0	0	1774	1663	0	1774	1663	1809
Q Serve(g_s), s	2.6	0.0	0.0	0.0	0.0	0.0	0.6	38.0	0.0	1.1	21.6	21.7
Cycle Q Clear(g_c), s	7.2	0.0	0.0	3.2	0.0	0.0	0.6	38.0	0.0	1.1	21.6	21.7
Prop In Lane	0.10		0.70	0.40		0.50	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	180	0	0	191	0	0	210	3515	0	159	2370	1289
V/C Ratio(X)	0.59	0.00	0.00	0.27	0.00	0.00	0.15	0.75	0.00	0.40	0.56	0.56
Avail Cap(c_a), veh/h	658	0	0	630	0	0	248	3515	0	214	2370	1289
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	0.0	0.0	48.6	0.0	0.0	6.6	10.6	0.0	18.4	7.8	7.8
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.8	0.0	0.0	0.3	1.5	0.0	1.6	1.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	0.0	1.6	0.0	0.0	0.3	17.7	0.0	1.5	10.1	11.3
LnGrp Delay(d),s/veh	53.4	0.0	0.0	49.4	0.0	0.0	6.9	12.1	0.0	20.0	8.8	9.6
LnGrp LOS	D			D			A	B		B	A	A
Approach Vol, veh/h		106			52			2679			2110	
Approach Delay, s/veh		53.4			49.4			12.1			9.4	
Approach LOS		D			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.5	88.0		16.1	10.5	87.1		16.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	81.0		44.0	7.0	79.0		44.0
Max Q Clear Time (g_c+I1), s	2.6	23.7		9.2	3.1	40.0		5.2
Green Ext Time (p_c), s	0.0	55.4		1.0	0.0	38.1		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	5	35	20	5	45	15	1925	20	305	3160	15
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1863	1900	1863	1810	1900	1810	1810	1900
Adj Flow Rate, veh/h	5	5	38	22	5	48	16	2070	0	328	3398	16
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	2	2	2	2	5	5	5	5	5
Cap, veh/h	45	17	87	70	16	71	104	2965	0	365	3663	17
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.01	0.60	0.00	0.14	0.72	0.72
Sat Flow, veh/h	85	248	1265	355	227	1034	1774	5103	0	1723	5075	24
Grp Volume(v), veh/h	48	0	0	75	0	0	16	2070	0	328	2203	1211
Grp Sat Flow(s),veh/h/ln	1598	0	0	1616	0	0	1774	1647	0	1723	1647	1806
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	0.4	29.6	0.0	11.2	57.6	58.0
Cycle Q Clear(g_c), s	3.0	0.0	0.0	4.5	0.0	0.0	0.4	29.6	0.0	11.2	57.6	58.0
Prop In Lane	0.10		0.79	0.29		0.64	1.00		0.00	1.00		0.01
Lane Grp Cap(c), veh/h	149	0	0	157	0	0	104	2965	0	365	2377	1303
V/C Ratio(X)	0.32	0.00	0.00	0.48	0.00	0.00	0.15	0.70	0.00	0.90	0.93	0.93
Avail Cap(c_a), veh/h	657	0	0	661	0	0	165	2965	0	534	2377	1303
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	0.0	0.0	46.5	0.0	0.0	22.1	14.1	0.0	27.9	12.0	12.0
Incr Delay (d2), s/veh	1.2	0.0	0.0	2.3	0.0	0.0	0.7	1.4	0.0	13.4	7.8	12.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	2.2	0.0	0.0	0.3	13.6	0.0	10.4	28.3	32.9
LnGrp Delay(d),s/veh	47.1	0.0	0.0	48.8	0.0	0.0	22.8	15.5	0.0	41.3	19.7	24.9
LnGrp LOS	D			D			C	B		D	B	C
Approach Vol, veh/h		48			75			2086			3742	
Approach Delay, s/veh		47.1			48.8			15.5			23.3	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.5	81.0		13.1	20.9	68.5		13.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	74.0		41.0	24.0	55.0		41.0
Max Q Clear Time (g_c+I1), s	2.4	60.0		5.0	13.2	31.6		6.5
Green Ext Time (p_c), s	0.0	13.9		0.8	0.7	23.4		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	21.1
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	15	25	85	25	5	35	40	3060	40	70	2325	45
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1827	1900	1863	1828	1900
Adj Flow Rate, veh/h	16	26	89	26	5	37	42	3221	0	74	2447	47
Adj No. of Lanes	0	1	0	0	1	0	1	3	0	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	4	2	4	4
Cap, veh/h	36	39	108	67	22	71	150	3800	0	104	3853	74
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.02	0.76	0.00	0.02	0.76	0.76
Sat Flow, veh/h	128	402	1122	388	227	734	1774	5153	0	1774	5040	97
Grp Volume(v), veh/h	131	0	0	68	0	0	42	3221	0	74	1612	882
Grp Sat Flow(s),veh/h/ln	1651	0	0	1349	0	0	1774	1663	0	1774	1663	1811
Q Serve(g_s), s	5.2	0.0	0.0	0.0	0.0	0.0	0.9	72.9	0.0	1.6	37.2	37.6
Cycle Q Clear(g_c), s	13.0	0.0	0.0	7.7	0.0	0.0	0.9	72.9	0.0	1.6	37.2	37.6
Prop In Lane	0.12		0.68	0.38		0.54	1.00		0.00	1.00		0.05
Lane Grp Cap(c), veh/h	183	0	0	159	0	0	150	3800	0	104	2543	1384
V/C Ratio(X)	0.72	0.00	0.00	0.43	0.00	0.00	0.28	0.85	0.00	0.71	0.63	0.64
Avail Cap(c_a), veh/h	372	0	0	332	0	0	188	3800	0	127	2543	1384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	74.4	0.0	0.0	71.8	0.0	0.0	10.1	13.5	0.0	45.1	9.0	9.1
Incr Delay (d2), s/veh	5.2	0.0	0.0	1.8	0.0	0.0	1.0	2.5	0.0	13.2	1.2	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	0.0	3.1	0.0	0.0	0.7	34.0	0.0	3.0	17.2	19.5
LnGrp Delay(d),s/veh	79.6	0.0	0.0	73.6	0.0	0.0	11.1	16.0	0.0	58.3	10.3	11.3
LnGrp LOS	E			E			B	B		E	B	B
Approach Vol, veh/h		131			68			3263			2568	
Approach Delay, s/veh		79.6			73.6			15.9			12.0	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.4	135.4		22.1	10.9	135.0		22.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	7.0	127.0		36.0	6.0	128.0		36.0
Max Q Clear Time (g_c+I1), s	2.9	39.6		15.0	3.6	74.9		9.7
Green Ext Time (p_c), s	0.0	86.7		1.2	0.0	52.8		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	16.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	5	25	15	5	40	10	1580	15	250	2590	10
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1863	1900	1863	1810	1810	1810	1810	1900
Adj Flow Rate, veh/h	5	5	27	16	5	43	11	1699	0	269	2785	11
Adj No. of Lanes	0	1	0	0	1	0	1	3	1	1	3	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	2	2	2	2	5	5	5	5	5
Cap, veh/h	48	19	71	62	14	65	129	3310	1031	334	3716	15
Arrive On Green	0.06	0.06	0.06	0.06	0.06	0.06	0.01	0.67	0.00	0.07	0.73	0.73
Sat Flow, veh/h	120	316	1177	290	236	1078	1774	4940	1538	1723	5080	20
Grp Volume(v), veh/h	37	0	0	64	0	0	11	1699	0	269	1805	991
Grp Sat Flow(s),veh/h/ln	1613	0	0	1605	0	0	1774	1647	1538	1723	1647	1806
Q Serve(g_s), s	0.0	0.0	0.0	1.6	0.0	0.0	0.2	17.5	0.0	4.6	32.9	33.0
Cycle Q Clear(g_c), s	2.2	0.0	0.0	3.9	0.0	0.0	0.2	17.5	0.0	4.6	32.9	33.0
Prop In Lane	0.14		0.73	0.25		0.67	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	138	0	0	141	0	0	129	3310	1031	334	2409	1321
V/C Ratio(X)	0.27	0.00	0.00	0.45	0.00	0.00	0.09	0.51	0.00	0.81	0.75	0.75
Avail Cap(c_a), veh/h	667	0	0	673	0	0	198	3310	1031	619	2409	1321
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	0.0	0.0	46.4	0.0	0.0	9.2	8.4	0.0	14.2	8.1	8.1
Incr Delay (d2), s/veh	1.0	0.0	0.0	2.3	0.0	0.0	0.3	0.6	0.0	4.6	2.2	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	1.8	0.0	0.0	0.1	8.0	0.0	5.6	15.3	17.7
LnGrp Delay(d),s/veh	46.8	0.0	0.0	48.7	0.0	0.0	9.5	9.0	0.0	18.8	10.3	12.0
LnGrp LOS	D			D			A	A		B	B	B
Approach Vol, veh/h		37			64			1710			3065	
Approach Delay, s/veh		46.8			48.7			9.0			11.6	
Approach LOS		D			D			A			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.1	81.0		12.1	14.3	74.8		12.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	74.0		41.0	24.0	55.0		41.0
Max Q Clear Time (g_c+I1), s	2.2	35.0		4.2	6.6	19.5		5.9
Green Ext Time (p_c), s	0.0	37.7		0.6	0.7	34.5		0.6

Intersection Summary	
HCM 2010 Ctrl Delay	11.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	10	20	70	20	5	25	30	2515	30	60	1905	40
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1827	1863	1863	1828	1900
Adj Flow Rate, veh/h	11	21	74	21	5	26	32	2647	0	63	2005	42
Adj No. of Lanes	0	1	0	0	1	0	1	3	1	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	4
Cap, veh/h	43	36	101	87	31	73	210	3514	1116	159	3584	75
Arrive On Green	0.09	0.09	0.09	0.09	0.09	0.09	0.02	0.70	0.00	0.03	0.71	0.71
Sat Flow, veh/h	92	399	1137	477	345	821	1774	4988	1583	1774	5030	105
Grp Volume(v), veh/h	106	0	0	52	0	0	32	2647	0	63	1325	722
Grp Sat Flow(s),veh/h/ln	1629	0	0	1643	0	0	1774	1663	1583	1774	1663	1809
Q Serve(g_s), s	2.6	0.0	0.0	0.0	0.0	0.0	0.6	38.0	0.0	1.1	21.6	21.7
Cycle Q Clear(g_c), s	7.2	0.0	0.0	3.2	0.0	0.0	0.6	38.0	0.0	1.1	21.6	21.7
Prop In Lane	0.10		0.70	0.40		0.50	1.00		1.00	1.00		0.06
Lane Grp Cap(c), veh/h	180	0	0	191	0	0	210	3514	1116	159	2370	1289
V/C Ratio(X)	0.59	0.00	0.00	0.27	0.00	0.00	0.15	0.75	0.00	0.40	0.56	0.56
Avail Cap(c_a), veh/h	658	0	0	630	0	0	248	3514	1116	214	2370	1289
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	0.0	0.0	48.6	0.0	0.0	6.6	10.6	0.0	18.4	7.8	7.8
Incr Delay (d2), s/veh	3.0	0.0	0.0	0.8	0.0	0.0	0.3	1.5	0.0	1.6	1.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	0.0	1.6	0.0	0.0	0.3	17.7	0.0	1.5	10.1	11.3
LnGrp Delay(d),s/veh	53.4	0.0	0.0	49.4	0.0	0.0	6.9	12.1	0.0	20.0	8.8	9.6
LnGrp LOS	D			D			A	B		B	A	A
Approach Vol, veh/h		106			52			2679			2110	
Approach Delay, s/veh		53.4			49.4			12.1			9.4	
Approach LOS		D			D			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.5	88.0		16.1	10.5	87.1		16.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	81.0		44.0	7.0	79.0		44.0
Max Q Clear Time (g_c+I1), s	2.6	23.7		9.2	3.1	40.0		5.2
Green Ext Time (p_c), s	0.0	55.4		1.0	0.0	38.1		1.1

Intersection Summary	
HCM 2010 Ctrl Delay	12.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	5	5	35	20	5	45	15	1925	20	305	3160	15
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1810	1900	1900	1863	1900	1863	1810	1810	1810	1810	1900
Adj Flow Rate, veh/h	5	5	38	22	5	48	16	2070	0	328	3398	16
Adj No. of Lanes	0	1	0	0	1	0	1	3	1	1	3	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	5	5	5	2	2	2	2	5	5	5	5	5
Cap, veh/h	46	17	88	71	16	72	105	2925	911	366	3627	17
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.01	0.59	0.00	0.14	0.71	0.71
Sat Flow, veh/h	85	248	1264	354	228	1033	1774	4940	1538	1723	5075	24
Grp Volume(v), veh/h	48	0	0	75	0	0	16	2070	0	328	2203	1211
Grp Sat Flow(s),veh/h/ln	1597	0	0	1615	0	0	1774	1647	1538	1723	1647	1806
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	0.4	29.2	0.0	10.9	57.3	57.7
Cycle Q Clear(g_c), s	2.9	0.0	0.0	4.4	0.0	0.0	0.4	29.2	0.0	10.9	57.3	57.7
Prop In Lane	0.10		0.79	0.29		0.64	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	151	0	0	159	0	0	105	2925	911	366	2354	1290
V/C Ratio(X)	0.32	0.00	0.00	0.47	0.00	0.00	0.15	0.71	0.00	0.90	0.94	0.94
Avail Cap(c_a), veh/h	724	0	0	728	0	0	169	2925	911	547	2354	1290
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.3	0.0	0.0	45.0	0.0	0.0	22.3	14.2	0.0	27.0	12.2	12.3
Incr Delay (d2), s/veh	1.2	0.0	0.0	2.2	0.0	0.0	0.7	1.5	0.0	12.4	8.6	14.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	0.0	2.1	0.0	0.0	0.3	13.6	0.0	10.0	28.2	33.3
LnGrp Delay(d),s/veh	45.5	0.0	0.0	47.1	0.0	0.0	23.0	15.7	0.0	39.4	20.8	26.3
LnGrp LOS	D			D			C	B		D	C	C
Approach Vol, veh/h		48			75			2086			3742	
Approach Delay, s/veh		45.5			47.1			15.7			24.2	
Approach LOS		D			D			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.4	78.0		12.9	20.6	65.8		12.9
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	5.0	71.0		44.0	24.0	52.0		44.0
Max Q Clear Time (g_c+I1), s	2.4	59.7		4.9	12.9	31.2		6.4
Green Ext Time (p_c), s	0.0	11.3		0.8	0.7	20.7		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	21.7
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	15	25	85	25	5	35	40	3060	40	70	2325	45
Number	7	4	14	3	8	18	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1900	1863	1827	1863	1863	1828	1900
Adj Flow Rate, veh/h	16	26	89	26	5	37	42	3221	0	74	2447	47
Adj No. of Lanes	0	1	0	0	1	0	1	3	1	1	3	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	4	2	2	4	4
Cap, veh/h	36	39	108	67	22	71	150	3799	1206	104	3853	74
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.02	0.76	0.00	0.02	0.76	0.76
Sat Flow, veh/h	128	402	1122	388	227	734	1774	4988	1583	1774	5040	97
Grp Volume(v), veh/h	131	0	0	68	0	0	42	3221	0	74	1612	882
Grp Sat Flow(s),veh/h/ln	1651	0	0	1349	0	0	1774	1663	1583	1774	1663	1811
Q Serve(g_s), s	5.2	0.0	0.0	0.0	0.0	0.0	0.9	73.0	0.0	1.6	37.2	37.6
Cycle Q Clear(g_c), s	13.0	0.0	0.0	7.7	0.0	0.0	0.9	73.0	0.0	1.6	37.2	37.6
Prop In Lane	0.12		0.68	0.38		0.54	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	183	0	0	159	0	0	150	3799	1206	104	2543	1384
V/C Ratio(X)	0.72	0.00	0.00	0.43	0.00	0.00	0.28	0.85	0.00	0.71	0.63	0.64
Avail Cap(c_a), veh/h	372	0	0	332	0	0	188	3799	1206	127	2543	1384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	74.4	0.0	0.0	71.8	0.0	0.0	10.1	13.5	0.0	45.1	9.0	9.1
Incr Delay (d2), s/veh	5.2	0.0	0.0	1.8	0.0	0.0	1.0	2.5	0.0	13.2	1.2	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	0.0	3.1	0.0	0.0	0.7	34.0	0.0	3.0	17.2	19.5
LnGrp Delay(d),s/veh	79.6	0.0	0.0	73.6	0.0	0.0	11.1	16.0	0.0	58.3	10.3	11.3
LnGrp LOS	E			E			B	B		E	B	B
Approach Vol, veh/h		131			68			3263			2568	
Approach Delay, s/veh		79.6			73.6			15.9			12.0	
Approach LOS		E			E			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.4	135.4		22.1	10.9	135.0		22.1
Change Period (Y+Rc), s	7.0	7.0		6.0	7.0	7.0		6.0
Max Green Setting (Gmax), s	7.0	127.0		36.0	6.0	128.0		36.0
Max Q Clear Time (g_c+I1), s	2.9	39.6		15.0	3.6	75.0		9.7
Green Ext Time (p_c), s	0.0	86.7		1.2	0.0	52.7		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	16.3
HCM 2010 LOS	B

Appendix E
SimTraffic Outputs

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0	2.0	0.7	0.9
Total Del/Veh (s)	40.0	51.7	12.4	45.5	42.8	27.1	27.7	8.2	4.6	20.6	6.0	5.1

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	0.5
Total Del/Veh (s)	8.1

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.3	0.1	0.0	0.0	0.1
Total Del/Veh (s)	9.4	2.1	0.3	0.6	1.5

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	14.2

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	B10	B9	NW	NW	NW	NW
Directions Served	LTR	LTR	L	T	T	TR	T	T	L	T	T	TR
Maximum Queue (ft)	71	77	36	207	193	232	16	11	183	196	177	242
Average Queue (ft)	25	35	6	102	108	112	1	0	82	72	61	90
95th Queue (ft)	58	68	25	180	188	202	10	8	153	152	133	196
Link Distance (ft)	662	764		171	171	171	42	11		628	628	628
Upstream Blk Time (%)				1	1	2	0					
Queuing Penalty (veh)				4	3	8	0					
Storage Bay Dist (ft)			233						185			
Storage Blk Time (%)				1					0	0		
Queuing Penalty (veh)				0					1	0		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	NW	NW	B9	B10
Directions Served	R	T	T	R	T	T
Maximum Queue (ft)	136	14	50	74	17	10
Average Queue (ft)	35	1	2	19	1	0
95th Queue (ft)	95	7	20	59	7	7
Link Distance (ft)	6237	2397	11	11	42	171
Upstream Blk Time (%)			0	1	0	
Queuing Penalty (veh)			0	4	0	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 23

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.3	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	2.1	0.3	0.6
Total Del/Veh (s)	48.2	44.2	22.9	45.1	43.4	18.8	19.8	5.9	3.6	32.3	5.1	3.8

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	6.7

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.3	0.2	0.0	0.0	0.1
Total Del/Veh (s)	26.8	3.6	0.2	0.3	4.0

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	14.8

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	B10	B10	B10	B9	B9	B9
Directions Served	LTR	LTR	L	T	T	TR	T	T	T	T	T	T
Maximum Queue (ft)	125	89	140	230	245	262	46	60	82	4	6	98
Average Queue (ft)	53	34	20	107	123	126	2	3	7	0	0	5
95th Queue (ft)	98	73	67	211	227	237	23	26	43	3	5	47
Link Distance (ft)	662	764		171	171	171	42	42	42	11	11	11
Upstream Blk Time (%)			0	2	3	3	0	0	1	0	0	0
Queuing Penalty (veh)			0	14	21	25	2	3	6	0	0	1
Storage Bay Dist (ft)			233									
Storage Blk Time (%)			0	2								
Queuing Penalty (veh)			0	1								

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	NW	NW	NW	NW
Directions Served	L	T	T	TR
Maximum Queue (ft)	78	198	154	213
Average Queue (ft)	29	79	54	65
95th Queue (ft)	62	158	125	154
Link Distance (ft)		628	628	628
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	185			
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	NW
Directions Served	R	T	T	R
Maximum Queue (ft)	329	37	89	29
Average Queue (ft)	133	1	8	2
95th Queue (ft)	279	22	45	15
Link Distance (ft)	6237	2397	2397	11
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 72

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	2.2	0.9	1.1
Total Del/Veh (s)	23.8	36.2	9.1	39.3	39.3	28.2	23.0	9.8	4.7	25.9	7.3	5.3

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	9.6

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.1	0.0	0.0	0.1
Total Del/Veh (s)	10.4	2.4	0.4	0.7	1.8

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	16.5

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	B10	B10	B10	B9	NW	NW
Directions Served	LTR	LTR	L	T	T	TR	T	T	T	T	L	T
Maximum Queue (ft)	67	91	61	243	232	254	45	18	92	42	206	342
Average Queue (ft)	20	38	7	118	125	137	2	1	6	1	108	96
95th Queue (ft)	52	77	35	217	223	246	16	10	39	23	189	240
Link Distance (ft)	662	764		171	171	171	42	42	42	11		628
Upstream Blk Time (%)				3	3	5	0	0	1	0		
Queuing Penalty (veh)				14	16	25	1	0	5	0		
Storage Bay Dist (ft)			233								185	
Storage Blk Time (%)				3							2	1
Queuing Penalty (veh)				0							19	1

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	NW	NW
Directions Served	T	TR
Maximum Queue (ft)	283	321
Average Queue (ft)	84	119
95th Queue (ft)	194	261
Link Distance (ft)	628	628
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	NW	NW	NW	NW	B9	B10
Directions Served	R	T	T	T	T	T	R	T	T
Maximum Queue (ft)	161	3	51	42	28	19	95	53	5
Average Queue (ft)	49	0	4	3	1	1	26	3	0
95th Queue (ft)	119	2	25	20	12	10	76	23	4
Link Distance (ft)	6237	2397	2397	11	11	11	11	42	171
Upstream Blk Time (%)				0	0	0	1	0	
Queuing Penalty (veh)				0	0	0	7	2	
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Network Summary

Network wide Queuing Penalty: 90

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	1.9	0.4	0.5
Total Del/Veh (s)	49.8	45.9	26.4	44.1	57.1	17.1	22.8	7.1	3.7	35.9	5.8	4.4

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	7.8

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.2	0.0	0.0	0.1
Total Del/Veh (s)	51.6	4.2	0.2	0.4	6.2

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	18.8

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	B10	B10	B10	B9	B9	B9
Directions Served	LTR	LTR	L	T	T	TR	T	T	T	T	T	T
Maximum Queue (ft)	137	82	65	246	246	258	78	84	110	19	24	62
Average Queue (ft)	60	30	21	131	143	156	7	9	14	1	1	3
95th Queue (ft)	113	64	51	244	247	268	48	51	68	12	12	30
Link Distance (ft)	662	764		171	171	171	42	42	42	11	11	11
Upstream Blk Time (%)				4	5	6	1	1	2	0	0	0
Queuing Penalty (veh)				32	39	50	7	10	16	0	0	0
Storage Bay Dist (ft)			233									
Storage Blk Time (%)				4								
Queuing Penalty (veh)				1								

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	NW	NW	NW	NW
Directions Served	L	T	T	TR
Maximum Queue (ft)	108	230	238	225
Average Queue (ft)	33	89	70	83
95th Queue (ft)	75	176	161	167
Link Distance (ft)		628	628	628
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	185			
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	SE	NW	NW
Directions Served	R	T	T	T	T	R
Maximum Queue (ft)	549	4	70	104	8	29
Average Queue (ft)	217	0	2	9	0	3
95th Queue (ft)	470	3	35	54	6	19
Link Distance (ft)	6237	2397	2397	2397	11	11
Upstream Blk Time (%)						0
Queuing Penalty (veh)						0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 156

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.1	0.2	0.1	0.2	0.1	0.2	0.0	0.0	0.0	8.3	7.5	5.0
Total Del/Veh (s)	40.3	48.0	14.5	41.1	40.9	38.3	33.8	17.0	9.1	39.3	19.1	18.5

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	4.8
Total Del/Veh (s)	19.8

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.1	0.0	0.0	0.1
Total Del/Veh (s)	16.8	3.3	0.7	1.1	2.8

Total Network Performance

Denied Del/Veh (s)	4.8
Total Del/Veh (s)	30.2

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	B10	B10	B10	B9	B9	B9
Directions Served	LTR	LTR	L	T	T	TR	T	T	T	T	T	T
Maximum Queue (ft)	80	150	146	270	264	281	104	114	140	27	45	143
Average Queue (ft)	29	53	16	195	198	214	17	19	41	1	3	19
95th Queue (ft)	65	107	69	280	278	301	68	76	122	14	22	85
Link Distance (ft)	662	764		171	171	171	42	42	42	11	11	11
Upstream Blk Time (%)			0	12	13	18	2	3	6	0	0	1
Queuing Penalty (veh)			0	79	86	118	16	17	41	0	1	4
Storage Bay Dist (ft)			233									
Storage Blk Time (%)			0	12								
Queuing Penalty (veh)			0	2								

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	NW	NW	NW	NW
Directions Served	L	T	T	TR
Maximum Queue (ft)	210	598	522	662
Average Queue (ft)	155	233	254	357
95th Queue (ft)	237	493	498	670
Link Distance (ft)		628	628	628
Upstream Blk Time (%)		0		4
Queuing Penalty (veh)		0		0
Storage Bay Dist (ft)	185			
Storage Blk Time (%)	6	5		
Queuing Penalty (veh)	58	15		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	NW	NW	NW	NW	B9	B10
Directions Served	R	T	T	T	T	R	T	T
Maximum Queue (ft)	270	53	51	42	19	109	88	14
Average Queue (ft)	101	5	5	3	1	49	11	0
95th Queue (ft)	204	29	30	21	10	103	52	10
Link Distance (ft)	6237	2397	11	11	11	11	42	171
Upstream Blk Time (%)			0	0	0	3	1	
Queuing Penalty (veh)			0	0	0	22	8	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 468

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.2	0.2	0.2	0.1	0.1	0.2	0.0	0.0	0.0	1.8	0.6	1.1
Total Del/Veh (s)	62.9	63.8	52.0	65.9	93.6	41.3	43.4	11.5	7.4	72.7	10.0	9.3

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	13.3

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	42.8	0.3	0.0	0.0	3.4
Total Del/Veh (s)	958.4	17.1	0.4	0.6	88.6

Total Network Performance

Denied Del/Veh (s)	3.5
Total Del/Veh (s)	105.0

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	B10	B10	B10	B9	B9	B9
Directions Served	LTR	LTR	L	T	T	TR	T	T	T	T	T	T
Maximum Queue (ft)	229	141	151	276	274	276	133	143	138	159	163	164
Average Queue (ft)	105	53	32	199	210	213	56	64	65	42	50	53
95th Queue (ft)	186	109	95	316	315	309	143	155	153	145	155	165
Link Distance (ft)	662	764		171	171	171	42	42	42	11	11	11
Upstream Blk Time (%)			0	14	16	16	10	12	12	2	3	3
Queuing Penalty (veh)			0	146	171	170	105	127	128	17	22	24
Storage Bay Dist (ft)			233									
Storage Blk Time (%)			0	14								
Queuing Penalty (veh)			0	6								

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	NW	NW	NW	NW
Directions Served	L	T	T	TR
Maximum Queue (ft)	186	375	389	444
Average Queue (ft)	72	153	135	167
95th Queue (ft)	152	315	300	366
Link Distance (ft)		628	628	628
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	185			
Storage Blk Time (%)	0	4		
Queuing Penalty (veh)	2	3		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	SE	NW	NW	B9	B10
Directions Served	R	T	T	T	T	R	T	T
Maximum Queue (ft)	4898	507	500	499	9	69	15	11
Average Queue (ft)	3304	103	108	111	0	14	1	0
95th Queue (ft)	6179	472	487	490	6	50	8	7
Link Distance (ft)	6237	2397	2397	2397	11	11	42	171
Upstream Blk Time (%)	13					0	0	
Queuing Penalty (veh)	0					2	0	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 924

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SET	SER	NWL	NWT	NWR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.2	0.0	0.0	2.5	1.4	1.2	0.9
Total Del/Veh (s)	38.0	44.0	16.0	43.5	44.6	35.5	12.4	7.1	27.5	8.9	7.6	11.7

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.0	0.0	0.1	0.0
Total Del/Veh (s)	9.9	2.2	0.3	0.6	1.7

9: Pleasant Hill Rd Performance by movement

Movement	SET	NWT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.9	1.2	1.1

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	22.3

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	B10	B10	B10	NW	NW	NW	NW
Directions Served	LTR	LTR	T	T	TR	T	T	T	L	T	T	TR
Maximum Queue (ft)	77	119	253	259	261	89	79	82	204	294	294	357
Average Queue (ft)	26	47	149	162	170	6	7	9	110	98	102	149
95th Queue (ft)	61	94	247	256	265	40	43	48	184	213	217	315
Link Distance (ft)	662	764	171	171	171	54	54	54		628	628	628
Upstream Blk Time (%)			5	7	8	1	1	1				
Queuing Penalty (veh)			28	38	45	4	5	6				
Storage Bay Dist (ft)									185			
Storage Blk Time (%)			5						1	1		
Queuing Penalty (veh)			1						12	1		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	NW	NW	NW	NW
Directions Served	R	T	T	T	T	T	R
Maximum Queue (ft)	146	15	57	54	53	27	78
Average Queue (ft)	43	0	5	6	5	1	25
95th Queue (ft)	106	10	31	30	29	13	70
Link Distance (ft)	5622	493	493	15	15	15	15
Upstream Blk Time (%)				0	0	0	1
Queuing Penalty (veh)				0	1	0	9
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 9: Pleasant Hill Rd

Movement	SE	SE	SE	NW	NW	NW	NW	B10
Directions Served	T	T	T	T	T	T	T	T
Maximum Queue (ft)	29	10	72	22	17	6	92	18
Average Queue (ft)	2	1	6	2	1	0	18	1
95th Queue (ft)	18	10	49	12	8	6	61	11
Link Distance (ft)	15	15	15	54	54	54	54	171
Upstream Blk Time (%)	0	0	0				1	
Queuing Penalty (veh)	1	0	2				4	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 155

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SET	SER	NWL	NWT	NWR	All
Denied Del/Veh (s)	0.1	0.3	0.2	0.1	0.2	0.1	0.0	0.0	2.1	0.4	0.6	0.2
Total Del/Veh (s)	42.2	43.9	30.7	47.6	45.1	22.8	9.7	4.7	41.3	6.2	4.9	9.4

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.0	0.0	0.0	0.0
Total Del/Veh (s)	13.4	6.9	0.2	0.3	4.5

9: Pleasant Hill Rd Performance by movement

Movement	SET	NWT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	2.0	0.8	1.5

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	27.6

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	B10	B10	B10	NW	NW	NW	NW
Directions Served	LTR	LTR	T	T	TR	T	T	T	L	T	T	TR
Maximum Queue (ft)	160	103	263	276	271	134	111	94	107	214	222	236
Average Queue (ft)	71	35	184	188	184	35	29	16	42	96	75	92
95th Queue (ft)	130	76	292	293	281	116	101	68	85	183	163	188
Link Distance (ft)	662	764	171	171	171	54	54	54		628	628	628
Upstream Blk Time (%)			9	10	9	6	4	2				
Queuing Penalty (veh)			88	92	82	52	40	15				
Storage Bay Dist (ft)									185			
Storage Blk Time (%)			9							1		
Queuing Penalty (veh)			3							0		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	NW	NW	NW
Directions Served	R	T	T	T	T	R
Maximum Queue (ft)	253	115	141	34	21	18
Average Queue (ft)	84	10	16	1	1	1
95th Queue (ft)	192	72	96	14	11	11
Link Distance (ft)	5622	493	493	15	15	15
Upstream Blk Time (%)				0	0	0
Queuing Penalty (veh)				0	0	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 9: Pleasant Hill Rd

Movement	SE	SE	SE	NW	NW	NW
Directions Served	T	T	T	T	T	T
Maximum Queue (ft)	134	111	105	34	6	42
Average Queue (ft)	25	16	12	3	0	3
95th Queue (ft)	103	71	62	17	4	20
Link Distance (ft)	15	15	15	54	54	54
Upstream Blk Time (%)	2	1	1	0		0
Queuing Penalty (veh)	19	12	8	0		0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 412

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SET	SER	NWL	NWT	NWR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.0	3.9	2.9	3.0	1.9
Total Del/Veh (s)	36.2	44.4	18.5	41.9	43.4	40.2	18.0	10.7	40.5	15.9	18.5	18.4

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.0	0.0	0.1	0.1
Total Del/Veh (s)	10.9	3.5	0.5	0.7	2.2

9: Pleasant Hill Rd Performance by movement

Movement	SET	NWT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	1.6	1.6	1.6

Total Network Performance

Denied Del/Veh (s)	1.9
Total Del/Veh (s)	31.5

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	B10	B10	B10	NW	NW	NW	NW
Directions Served	LTR	LTR	T	T	TR	T	T	T	L	T	T	TR
Maximum Queue (ft)	80	123	275	268	275	107	112	130	209	559	582	650
Average Queue (ft)	31	52	206	213	214	30	31	36	160	205	220	272
95th Queue (ft)	69	103	292	291	296	95	98	107	237	450	466	514
Link Distance (ft)	662	764	171	171	171	54	54	54		628	628	628
Upstream Blk Time (%)			16	18	18	4	5	5		1	0	1
Queuing Penalty (veh)			104	120	119	28	34	34		0	0	0
Storage Bay Dist (ft)									185			
Storage Blk Time (%)			16						7	3		
Queuing Penalty (veh)			2						78	10		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	NW	NW	NW	NW
Directions Served	R	T	T	T	T	T	R
Maximum Queue (ft)	171	25	82	56	59	38	84
Average Queue (ft)	59	1	8	9	8	3	30
95th Queue (ft)	133	16	44	41	37	20	80
Link Distance (ft)	5622	493	493	15	15	15	15
Upstream Blk Time (%)				0	0	0	2
Queuing Penalty (veh)				1	1	0	14
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 9: Pleasant Hill Rd

Movement	SE	SE	SE	NW	NW	NW	NW	B10
Directions Served	T	T	T	T	T	T	T	T
Maximum Queue (ft)	111	100	137	48	31	54	105	12
Average Queue (ft)	13	11	24	5	2	3	34	0
95th Queue (ft)	67	58	96	26	16	25	86	6
Link Distance (ft)	15	15	15	54	54	54	54	171
Upstream Blk Time (%)	2	1	3	0	0	0	1	
Queuing Penalty (veh)	11	9	17	0	0	1	11	
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Network Summary

Network wide Queuing Penalty: 592

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SET	SER	NWL	NWT	NWR	All
Denied Del/Veh (s)	0.3	0.2	0.2	0.1	0.2	0.2	0.0	0.0	2.0	0.6	1.1	0.3
Total Del/Veh (s)	62.1	69.1	49.0	70.9	50.2	34.1	12.9	8.7	71.0	7.9	6.3	12.9

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.0	0.0	0.0	0.0
Total Del/Veh (s)	34.7	34.5	0.2	0.4	19.2

9: Pleasant Hill Rd Performance by movement

Movement	SET	NWT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	5.3	1.0	3.3

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	134.1

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	B10	B10	B10	NW	NW	NW	NW
Directions Served	LTR	LTR	T	T	TR	T	T	T	L	T	T	TR
Maximum Queue (ft)	216	158	277	271	264	140	128	109	169	311	293	284
Average Queue (ft)	102	54	226	220	212	96	84	55	65	125	102	129
95th Queue (ft)	184	115	323	323	327	161	156	124	132	261	237	279
Link Distance (ft)	662	764	171	171	171	54	54	54		628	628	628
Upstream Blk Time (%)			20	19	18	20	17	9				
Queuing Penalty (veh)			206	201	187	206	175	90				
Storage Bay Dist (ft)									185			
Storage Blk Time (%)			20							2		
Queuing Penalty (veh)			8							2		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	B12	B12	B12	NW
Directions Served	R	T	T	T	T		R
Maximum Queue (ft)	633	596	597	4239	4249	2402	39
Average Queue (ft)	166	430	477	2299	2326	916	3
95th Queue (ft)	575	744	769	4768	4784	1993	20
Link Distance (ft)	5622	493	493	4863	4863	4863	15
Upstream Blk Time (%)		17	23	3	3		0
Queuing Penalty (veh)		0	0	0	0		0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 9: Pleasant Hill Rd

Movement	SE	SE	SE	NW
Directions Served	T	T	T	T
Maximum Queue (ft)	167	150	151	76
Average Queue (ft)	121	75	55	5
95th Queue (ft)	193	164	138	32
Link Distance (ft)	15	15	15	54
Upstream Blk Time (%)	10	7	10	0
Queuing Penalty (veh)	106	75	101	1
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1359

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	2.4	1.4	1.8
Total Del/Veh (s)	44.5	47.0	17.3	39.9	35.8	34.6	40.0	11.9	4.3	28.9	9.0	7.6

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	0.9
Total Del/Veh (s)	11.6

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.1	0.0	0.0	0.1
Total Del/Veh (s)	9.6	2.2	0.5	0.8	1.8

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	19.2

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	SE	B10	B10	B10	B10	B9
Directions Served	LTR	LTR	L	T	T	T	R	T	T	T	T	T
Maximum Queue (ft)	63	99	62	245	251	248	244	48	68	33	45	6
Average Queue (ft)	22	45	5	142	153	157	69	2	3	2	4	0
95th Queue (ft)	53	87	33	238	237	241	224	20	26	19	34	4
Link Distance (ft)	652	764		171	171	171	171	42	42	42	42	11
Upstream Blk Time (%)			0	4	4	7	3	0	0	0	1	0
Queuing Penalty (veh)			0	17	19	29	13	1	2	1	3	0
Storage Bay Dist (ft)			233									
Storage Blk Time (%)			0	4								
Queuing Penalty (veh)			0	0								

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	B9	B9	NW	NW	NW	NW
Directions Served	T	T	L	T	T	TR
Maximum Queue (ft)	8	88	203	284	311	387
Average Queue (ft)	0	4	115	100	101	153
95th Queue (ft)	6	43	188	211	224	313
Link Distance (ft)	11	11		628	628	628
Upstream Blk Time (%)	0	0				
Queuing Penalty (veh)	0	0				
Storage Bay Dist (ft)			185			
Storage Blk Time (%)			1	1		
Queuing Penalty (veh)			11	2		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	NW	NW	NW	NW	B9	B10	B10
Directions Served	R	T	T	T	T	R	T	T	T
Maximum Queue (ft)	78	21	44	36	26	98	63	19	5
Average Queue (ft)	6	1	5	3	1	36	6	1	0
95th Queue (ft)	40	9	24	18	10	88	35	11	4
Link Distance (ft)	6237	2397	11	11	11	11	42	171	171
Upstream Blk Time (%)			0	0	0	2	0		
Queuing Penalty (veh)			0	0	0	13	3		
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Network Summary

Network wide Queuing Penalty: 116

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	1.9	0.4	0.5
Total Del/Veh (s)	43.4	48.4	33.8	39.8	47.7	22.5	26.6	9.1	4.2	37.8	6.8	6.0

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	9.3

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.2	0.0	0.0	0.1
Total Del/Veh (s)	10.6	4.0	0.3	0.4	3.0

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	17.9

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	SE	B10	B10	B10	B10	B9
Directions Served	LTR	LTR	L	T	T	T	R	T	T	T	T	T
Maximum Queue (ft)	140	86	146	261	258	266	256	84	94	112	84	22
Average Queue (ft)	66	31	22	152	167	181	91	11	14	27	5	1
95th Queue (ft)	121	69	74	269	269	291	259	57	66	95	34	15
Link Distance (ft)	652	764		171	171	171	171	42	42	42	42	11
Upstream Blk Time (%)			0	6	8	14	5	2	2	6	1	0
Queuing Penalty (veh)			0	40	52	94	32	11	14	39	5	1
Storage Bay Dist (ft)			233									
Storage Blk Time (%)			0	6								
Queuing Penalty (veh)			0	2								

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	B9	B9	B9	NW	NW	NW	NW
Directions Served	T	T	T	L	T	T	TR
Maximum Queue (ft)	31	58	77	106	273	255	278
Average Queue (ft)	2	5	3	37	105	80	97
95th Queue (ft)	17	32	34	80	201	173	202
Link Distance (ft)	11	11	11		628	628	628
Upstream Blk Time (%)	0	0	0				
Queuing Penalty (veh)	1	3	0				
Storage Bay Dist (ft)				185			
Storage Blk Time (%)					1		
Queuing Penalty (veh)					1		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	SE	NW	NW	NW
Directions Served	R	T	T	T	T	T	R
Maximum Queue (ft)	138	3	5	32	35	8	55
Average Queue (ft)	21	0	0	2	2	0	8
95th Queue (ft)	83	2	4	14	15	4	35
Link Distance (ft)	6237	2397	2397	2397	11	11	11
Upstream Blk Time (%)					0	0	0
Queuing Penalty (veh)					0	0	1
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Network Summary

Network wide Queuing Penalty: 296

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	9.3	8.7	7.2
Total Del/Veh (s)	35.7	39.3	16.7	41.8	44.9	35.2	35.3	18.4	7.1	38.8	18.8	22.1

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	5.5
Total Del/Veh (s)	20.1

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.4	0.1	0.0	0.0	0.1
Total Del/Veh (s)	10.5	2.8	0.8	1.1	2.2

Total Network Performance

Denied Del/Veh (s)	5.6
Total Del/Veh (s)	30.1

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	SE	B10	B10	B10	B10	B9
Directions Served	LTR	LTR	L	T	T	T	R	T	T	T	T	T
Maximum Queue (ft)	82	118	149	264	269	273	278	103	82	106	131	5
Average Queue (ft)	28	49	19	195	195	203	147	21	14	18	22	0
95th Queue (ft)	66	97	82	285	275	285	324	75	57	69	86	5
Link Distance (ft)	652	764		171	171	171	171	42	42	42	42	11
Upstream Blk Time (%)			0	12	13	24	13	3	2	4	4	0
Queuing Penalty (veh)			0	61	65	116	63	15	7	21	19	0
Storage Bay Dist (ft)			233									
Storage Blk Time (%)			0	12								
Queuing Penalty (veh)			0	2								

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	B9	B9	B9	NW	NW	NW	NW
Directions Served	T	T	T	L	T	T	TR
Maximum Queue (ft)	4	25	107	210	609	524	658
Average Queue (ft)	0	1	9	154	212	247	342
95th Queue (ft)	3	11	58	232	463	483	628
Link Distance (ft)	11	11	11		628	628	628
Upstream Blk Time (%)	0	0	0		0		3
Queuing Penalty (veh)	0	0	1		0		0
Storage Bay Dist (ft)				185			
Storage Blk Time (%)				5	5		
Queuing Penalty (veh)				57	14		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	NW	NW	NW	NW	B9	B10	B10
Directions Served	R	T	T	T	T	R	T	T	T
Maximum Queue (ft)	92	21	57	51	33	113	101	20	61
Average Queue (ft)	11	1	7	4	1	49	14	1	2
95th Queue (ft)	57	9	33	25	16	103	61	10	24
Link Distance (ft)	6237	2397	11	11	11	11	42	171	171
Upstream Blk Time (%)			0	0	0	3	1		
Queuing Penalty (veh)			1	0	0	24	13		
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Network Summary

Network wide Queuing Penalty: 481

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Denied Del/Veh (s)	0.2	0.2	0.2	0.1	0.2	0.1	0.0	0.0	0.0	2.0	0.6	1.1
Total Del/Veh (s)	74.1	70.3	60.1	65.9	86.4	43.2	48.5	15.4	6.8	78.8	11.7	11.0

2: Pleasant Hill Rd & May Rd/Sunset St Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	16.4

6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp Performance by movement

Movement	EBR	SET	NWT	NWR	All
Denied Del/Veh (s)	0.5	0.3	0.0	0.0	0.2
Total Del/Veh (s)	11.8	9.7	0.4	0.6	5.8

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	32.4

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	EB	WB	SE	SE	SE	SE	SE	B10	B10	B10	B10	B9
Directions Served	LTR	LTR	L	T	T	T	R	T	T	T	T	T
Maximum Queue (ft)	222	139	150	272	276	281	278	133	135	146	129	153
Average Queue (ft)	118	58	41	217	231	245	186	64	74	89	36	42
95th Queue (ft)	199	117	118	310	294	285	337	147	155	167	117	139
Link Distance (ft)	652	764		171	171	171	171	42	42	42	42	11
Upstream Blk Time (%)			0	17	22	41	20	12	15	36	9	2
Queuing Penalty (veh)			0	136	173	322	154	96	119	286	71	17
Storage Bay Dist (ft)			233									
Storage Blk Time (%)			0	17								
Queuing Penalty (veh)			0	7								

Intersection: 2: Pleasant Hill Rd & May Rd/Sunset St

Movement	B9	B9	B9	NW	NW	NW	NW
Directions Served	T	T	T	L	T	T	TR
Maximum Queue (ft)	159	173	131	209	443	435	458
Average Queue (ft)	52	75	19	72	176	151	185
95th Queue (ft)	157	187	90	155	349	320	370
Link Distance (ft)	11	11	11		628	628	628
Upstream Blk Time (%)	3	11	1				0
Queuing Penalty (veh)	27	83	11				0
Storage Bay Dist (ft)				185			
Storage Blk Time (%)				0	7		
Queuing Penalty (veh)				0	5		

Intersection: 6: Pleasant Hill Rd & Buford Hwy Exit Ramp & Buford Hwy Entrance Ramp

Movement	EB	SE	SE	SE	NW	B9
Directions Served	R	T	T	T	R	T
Maximum Queue (ft)	141	256	261	280	75	18
Average Queue (ft)	24	27	37	44	12	1
95th Queue (ft)	93	162	186	185	48	10
Link Distance (ft)	6237	2397	2397	2397	11	42
Upstream Blk Time (%)					0	0
Queuing Penalty (veh)					2	0
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 1509

Pleasant Hill Rd and Buford Highway PI 0013062
Kickoff Meeting - Minutes
October 15, 2015 2:00pm at Duluth City Hall
Notes by: Margie Pozin

- Introductions - Group went around the table with brief introductions. In attendance were the following individuals:
  - Steven Heng – GDOT PM
  - Margie Pozin – City PM / City Engineer
  - Tim Matthews – Consultant PM (Pond)
  - Andrea Greco – Consultant LA (Pond)
- Project History – Margie and Tim both described the project history in terms of scope. Project will include operational improvements as well as landscaping improvements. Operational can refer to lighting, pavement marking, signing improvements, etc.
- Project Discussion & Areas of Concern – Interchange is difficult to traverse. The southern intersection at Buford Highway is especially a problem. It is easy to turn into the wrong way traffic. May need to extend the barrier in between the lanes.Improvements to signing, marking, and lighting are a must. Geographical boundaries were discussed using the graphic from the RFQ. It is unlikely there will be anything more invasive than a turn lane or turn lane extension constructed. Most of the improvements will be to signing, marking, lighting, and landscaping. All improvements will be within the ROW. RR coordination may be an issue as the work will be within 200' of the RR ROW, but there are no impacts to the RR itself, so it should not be a complicated coordination process, if it's even required. If required, RR review process is a minimum of 60 days for initial review. Final comments take at least 30-60 days. Steven said that we will want to include coordination with the railroad in the schedule in case coordination needs to take place. Traffic counts in the report should include future counts for about 2019 based upon the schedule of this project (2 years ahead of

completion date). Pond will discuss traffic counts with subconsultant SEI who is performing the work. The City will need a lighting agreement since lights will be in the GDOT right of way. The lighting consultant needs to be GDOT certified (Pond is certified).

- Project Schedule – Start date was shifted due to the re-advertising process. Steven went through the schedule with the group and determined what needed to be included, and what could be removed. He indicated GDOT will update the schedule and he will forward the new version to the group. Steven originally indicated that the project cannot begin until the PFA is executed by GDOT. GDOT was holding the signed (by Duluth) version until City became LAP certified. City is now LAP certified, and the PFA needs to be executed. He will look for it and continue to route it for signatures. *(As a follow up, Steven called me to let me know that the City and the Consultant CAN begin without the executed PFA, but the City could not invoice GDOT without the executed PFA in place.)* Tim indicated the completion date on the schedule was fine, and he would not have any problem meeting it. CST funds are in FY 2017.
- Notes:
    - Steven will confirm whether project qualifies for a limited scope concept report. It should.
    - CTM will be held with GDOT D1. Can be held at City Hall for proximity to site with a field visit immediately thereafter. Steven will check on that as well. Margie to explain CTM to City Council and invite them (as guests) to observe. Pond will need to meet with the City Council before Concept Team meeting with GDOT is held.
    - Tim indicated he is hoping for a programmatic CE document for this project.
    - Tim requested project files, CaiCe files, UST studies, environmental documents, geotechnical reports, and plans from previous interchange project. Steven will look for those in house. If he cannot find them, Margie will request them from KHA.
    - Steven indicated he would like for the City to invoice GDOT monthly with an 80/20 split on every invoice. He will send Margie a sample

invoice package. Pond will include a progress report to the City outlining the tasks included in the invoice from Pond.

- Steven requested that he be copied on all correspondence relating to this project.
- Margie will send bi-weekly email blasts to Steven one the project gets going. Pond will send Margie an update bi-weekly so she can include this in her report to GDOT.
- Steven requested a monthly coordination conference call with City and consultant to discuss progress and issues. Pond will record meeting minutes from these calls.

ACTION ITEMS:

1. Steven to get updated schedule to Margie and Margie to forward to Tim.
2. Steven to look for PFA and continue routing it for signatures. If unable to locate, he will let Margie know, and Margie will have a new one signed by the City.
3. Steven will look for project files from interchange and if he can't locate them, he will let Margie know, and Margie will ask Kimley Horn.
4. Steven will advise Margie on when he wants to do monthly conference calls, and either Steven or Margie can set them up.

WORK SESSION NOTES
MAYOR AND COUNCIL
CITY OF DULUTH, GA
MARCH 28, 2016

PRESENT: **Mayor Harris, Council members Bomar, Dugan, Jones, Kelkenberg and Whitlock, City Manager, Department Directors, City Attorney, Finance Manager, PIO Manager, City Engineer**

5:30 PM - CALL TO ORDER

I. PUBLIC COMMENTS

None.

II. PRESENTATIONS

1. BUFORD HWY/PLEASANT HILL RD CONCEPT DESIGN UPDATE

City Engineer Margie Pozin came forward to discuss the request. In October of 2015, the City contracted with Pond & Company to develop construction plans for landscaping and interchange improvements at Buford Highway and Pleasant Hill Road (City project CD-65). The project goals include improvements to landscaping, lighting, and safety/operations. The project was assigned budget from a Georgia Department of Transportation (GDOT) settlement over billboards, and has $1.2 million dedicated in an 80/20 split ($960k Federal / $240k Local).

Pond started database collection, environmental research, traffic studies, and concept design in late October. As a Concept Team Meeting with GDOT is scheduled for March 31, the design team wants to confirm the concept meets the needs and expectations of the Council prior to presenting the concept plans to GDOT.

Pond representatives Tim Matthews and Andrea Greco came forward to outline the project. As this area is a primary gateway, the focus for design has included wayfinding, beautification enhancement and also operational improvements. Mr. Matthews noted that the area has a lack of lighting, as well as unsignalized retail access at a nearby intersection, which also present safety concerns.

Ms. Greco presented the site plan and showed where the current utilities are located as areas to avoid improvements. The plan calls for lighting to be added to the two “decision point” areas on Buford Highway, with future pedestrian lighting as funding allows. A signage inventory was taken and it was discovered that some are currently in the wrong location to assist people make driving decisions, and overhead signs are a viable possibility.

Landscaping was also discussed. Since there are a lot of billboards in the area, any added landscaping can’t block them. Wildflower meadows were also mentioned as an option that requires little maintenance.

As far as project highlights, the concept approval is ahead of schedule and there will be no right of way required on this project. The environmental document is a Programmatic Categorical Exclusion (PCE) which is quick to complete. It was agreed to focus the lighting dollars at the decision making points, which are the ramp terminals on Buford Highway.

City Manager James Riker suggested not using the City's decorative lighting standard but use standard highway lighting instead, since this location is too far removed from downtown to make sense for decorative lighting. As far as signage, Council favors use of more wayfinding signs in keeping with the City's newest designs as needed.

For landscaping, consideration could be given to rain gardens in the low areas, with the lowest maintenance effort/costs desired, where possible. Mayor Harris noted her preference for wildflowers and natural landscapes.

In conclusion, there are still Public art opportunities to be determined. Cost estimates were provided for the project.

2. MARKETING & EVENTS UPDATE

PIO Manager Alisa Williams provided a marketing and events update, highlighting achievements over the last year and what the concentration would be for the department in the coming year.

With the assistance and recommendations of Rock, Paper, Scissors, staff worked on the following: social media policy quarterly updates, specific strategies for events, and more themes around movies. Ms. Williams noted that Facebook was the biggest focus, and said that this year would be Instagram which is for a younger audience. She highlighted the introduction of the City's blog, an upgraded eblast program with better analytics and different subject lines, and use of an RPS tracking database to gather data on the usage of different types of social media. All of these contributed greatly to more attendance at events.

The Duluth Life has been enhanced and all editions feature segments on projects that can be used by the Economic Development staff to promote the City. The Annual report was redesigned, "Be Duluth" video created, and there is a community survey in the works.

There will be a new Duluth App which is not a template and will have video capabilities, hopefully launching at the end of May. Ms. Williams also said that several new "min-logos" worked well together, complementing each other while providing variety.

Mayor Harris asked about Vine and snapchat, and Ms. Williams noted that their temporary nature may not be as well suited to City marketing as others. Councilmember Bomar suggested using more "teasers," and Ms. Williams said they would be highly used for the upcoming Art Week as well as other events this year.

III. DISCUSSION ITEMS

1. BLUE RIDGE INDUSTRIAL PKWY – SINKHOLE REPAIRS/PIPE REPLACEMENT

City Engineer Margie Pozin came forward to explain that in mid-February, staff was contacted by the City of Berkeley Lake with a complaint that a lake within their city limits had turned a deep orange color. Their inspectors traced the source back to an industrial area in Duluth. City inspectors visited the site, did some research, and continued to monitor the situation through early March and conducted a full detention pond inspection on March 7th. At that time, a sinkhole was discovered on the shoulder of Blue Ridge Industrial Parkway which was about 15'-0" in diameter

and about 10-12' deep. Two utilities were exposed. Stormwater and Public Works staff immediately mobilized to find a way to stabilize the hole to prevent it from spreading into the road. The City's on-call contractor, Southern Premier, came out on March 8th to do an emergency video of the pipe crossing under the road to determine the extent of any damage. Staff also authorized the same contractor to complete an emergency stabilization patch of the sinkhole to keep the hole from getting worse. It is anticipated the stabilization patch will last a few weeks.

Through the video of the pipe and through inspections of the upper detention pond, it was determined that severe damage had taken place in the pipe, resulting in the collapse of the slopes on the upper detention pond. This damage was expanding to the shoulder where the sinkhole formed and was heading outward toward the road. The pipe is 60" corrugated metal, and is buried 25'-0" below the road. The pipe is crushed and corroded to such a degree it is siphoning dirt from above, where it is carried through the system into the lower pond, that then drains into Berkeley Lake where it is causing the Lake to turn color.

Ms. Pozin reported that, due to the extent of the damage, the pipe cannot be lined but it needs to be removed and replaced with Class 5 reinforced concrete pipe. This involves removing a section of the road 25'-0"deep, and replacing the pipe and the road in stages. A temporary road will be laid in the right of way to allow vehicles to continue accessing their businesses into the cul-de-sac.

The situation is further complicated by the ownership of the upper and lower ponds, as well as the pipe itself. The entire system is a private stormwater detention system owned by an industrial HOA. The HOA has not maintained the system, and does not have the money in place to make the repairs necessary to save the road. Full inspections were done on both ponds, and inspection reports will be sent to the responsible party for pond repairs, however, it is unlikely those repairs will be made before the road suffers catastrophic failure.

Ms. Pozin further noted that the City has gotten right of entry permission from two of the three impacted property owners, the third being Gwinnett County Public Schools (GCPS). The upper pond stretches across the edge of their property and continues back to the end of their neighboring back property. City staff met on site with GCPS staff to discuss the challenges associated with the project, and to allow them to see the severity of the damages already out there. The City also solicited a second opinion from another professional engineer who agreed this was in fact an emergency situation, which needed repair ASAP (see attached).

The City's partner contractor, Southern Premier, spent several hours on site with staff determining the best way to reconstruct and repair the damage for the best possible price, and submitted two cost estimates. One is for the sticker price, using the rates in his contract which is approximately $835,000. The other is for a reduced price of $489,000 doing much of the work at cost, or even at a loss, since he recognizes the magnitude of the problem and understands our budget is constrained.

This emergency repair project will take 6-8 weeks. Ms. Pozin said that GCBOE has agreed to participate up to $100,000 and will put the upper pond on a regular maintenance schedule. The City is required to perform repairs these repairs as we are obligated to keep our sediment from going into Berkeley Lake.

City Attorney Stephen Pereira explained the language in the deed records and noted that there was some ambiguity regarding defining what is dedicated as "public," and who is technically responsible for sedimentation beyond the roadway. Councilmember Jones felt that the business should be asked to contribute to the repairs as well since they are the sole party affected by disruption of transportation for the roadway repairs.

Council authorized staff to pursue corrective action and place repair contract approval on the April 11th agenda.

2. PARKS STRATEGIC MASTER PLAN UPDATE

Parks Director Kathy Marelle came forward to discuss the City's Park Master Plan, which was approved in 2007. Since that time, several City parks have been developed according to the approved plan. An update of the plan is vital in identifying future capital projects to correspond with the changing needs of the community. In February 2016, the City issued a request for proposal for updating the Parks Strategic Master Plan and received four proposals as follows:

Foresite Group	$58,000
Green Play	$59,999
Mack Cain Design	$60,000
Lose & Associates	$82,000

The Review Committee (Jim Dugan, Kelly Kelkenberg, David Jones, Wanda Bennewitz and Kathy Marelle) evaluated the proposals on March 22, 2016. The Foresite Group recognized the qualities of the Duluth community in their project plan with a great public involvement process, and included an aggressive schedule. They were also the only one that had NAPA experience. Therefore, the committee unanimously recommended awarding a contract to the Foresite Group for $58,000 plus 10% contingency for a total not to exceed $63,800.00.

Staff was authorized to place this item on the April 11th consent agenda.

3. DOWNTOWN DEVELOPMENT AREA BOUNDARY PRESENTATION

Economic Development Manager Chris McGahee explained the request. The Downtown Development Area was established by written description in the authorizing 1983 resolution. The March 2000 reactivation resolution of DDA maintained the 1983 Downtown Development Area. The Mayor and Council updated the Downtown Development Area on March 14, 2016 using the established development area with revised parcels and adding redeveloped adjoining parcels. Staff felt that additional parcels may need to be added which influence the Downtown Development Area. As more residential becomes part of the downtown mixture, staff requested more input on which boundaries make the most sense.

Council authorized a Joint committee to be formed with the DDA. Councilmembers Jones and Dugan will serve. As an appointed committee, notices of the meetings must be posted and minutes must be taken.

4. BOARD APPOINTMENTS –DOWNTOWN DEVELOPMENT AUTHORITY

Economic Development Manager Chris McGahee explained that one four year DDA Economic Interest term slot is up for regular appointment. There is also a two year unexpired DDA Economic Interest term to fill due to the resignation of Krista Ganley. Staff recommended Jim Graham fill the regular Economic Interest term. Mr. Graham is a property owner in the Town Park Place Townhome development and is a principal of Winter Environmental.

Staff recommended that Ken Odum be appointed to fill the unexpired term of Krista Ganley. Mr. Odum is a resident within the Downtown Development Area and has served on past DDA boards. His application is also attached.

Staff was authorized to place this item on the April 11th Council consent agenda.

5. BOARD APPOINTMENTS – DULUTH PUBLIC ART COMMISSION

Community Development Director Nick Colonna came forward to explain the request. Due to personal conflicts there are four openings on the Duluth Public Art Commission (DPAC). Staff has received a total of six applications. One of the applications was part of last year's series of interviews and five are new. The Mayor, former DPAC Chair and Community Development Director met with the three potential applicants and are recommending two of the

three to move forward for appointment. Additionally, there are two applicants that we did not interview (Louis Tseng and Eddie Owen). The committee is additionally recommending their appointment. Mr. Tseng interviewed last year and would have fit well. However, there were more candidates than open positions to fill. For these new openings Council requested he be contacted to determine his commitment to the DPAC and move forward with an appointment if appropriate. Eddie Owen, who manages the Red Clay Theatre, is the other applicant that we did not interview. Due to his success with operating the Red Clay and high level expertise on musical production, the committee concluded that an interview was not necessary.

The recommended applicants and positions are listed below, and their applications are attached for review.

Louis Tseng	Alternate
Eva Kuhn	Alternate
James Mack	Resident Art Professional
Eddie Owen	Resident Art Professional

Staff was authorized to place this item on the April 11th Council agenda for consideration.

6. ORDINANCE TO AMEND CODE – PER DIEM/LODGING/TRAVEL

Finance Manager Ken Sakmar came forward to explain the request. The purpose of the amendment is to update section 2-47 of Article III of the Duluth Code regarding Per Diem, Lodging, Travel and Overnight Expenses. Staff recommended updating sections of the Code to be more in line with current practices. Some of the noted updates include:

1. Per diem section now references U. S. General Services Administration schedule of per diem rates. Clarifies allowable per diem for the first and last day of travel based on departure and return times. Per diem allowance is based on breakfast, lunch and dinner to be in line with per diem rate schedules and not the previous 4 quarter of the day.

2. Required Meal Deductions section was updated to clarify rules where meals are provide as part of the conference or seminar. Employees will be required to submit meeting/conference agendas with their per diem request. Rules for an exception based on medical restrictions, dietary or religious convictions have been added.

3. Accommodations section now requires the employee to reimburse the City for exempt taxes when the tax is the result of a failure to use hotel/motel tax exempt forms for travel.

4. Transportation and Travel Reimbursement section has been update to include multiple forms for travel. Mileage must be substantiated using an internet driving map site. City credit or fuel charge card cannot be used to purchase gas for a personal vehicle. The code now address the use of rental cars, air and rail travel and taxi or shuttle.

Staff was authorized to place this item on the April 11th Council agenda for consideration, to include the elected officials as well.

7. AUTHORIZATION FOR CONTRACT – $13,000 - LUSK CONSTRUCTION

City Manager James Riker explained that added construction on the Block (Parsons Alley) would be necessary to install a grease trap line and sanitary sewer for the Best of Brews building while the plaza area work is under construction. An easement area was needed in the back of the building for the new Parsons Alley sign rather than allowing the property owner to extend his building into the alley; installing the grease trap and sewer line will improve the space for future tenants and was offered in exchange for the easement.

8. REPUBLIC SERVICES – TRASH FEE INCREASE

City Manager James Riker explained that Republic Services has asked for a price increase. Under the terms of this exclusive contract for waste management, the company is permitted to seek incremental increases. Mr. Riker asked Council if the City wanted to absorb the increase or pass it through to the consumers.

As trash service is very reasonable in the City and based on the "pay as you throw" concept of bag usage, Council recommended the customers be responsible for any increase.

IV. ADJOURNMENT TO SPECIAL CALLED MEETING

MINUTESOF THE SPECIAL CALLED MEETING
MAYOR AND COUNCIL
CITY OF DULUTH, GA
MARCH 28, 2016

Mayor Harris called the meeting to order at 7:20 pm

I. EXECUTIVE SESSION

It was necessary to adjourn to executive session to discuss real estate, personnel, and/or potential/pending litigation.

A motion was made by Councilmember Jones, seconded by Councilmember Dugan, to adjourn to executive session at 7:20 p.m.

Those voting for: Council members Bomar, Dugan, Jones, Kelkenberg and Whitlock
Motion carried.

After the discussion, a motion was made by Councilmember Kelkenberg, seconded by Councilmember Bomar, to return to regular session at 8:00 p.m.

Those voting for: Council members Bomar, Dugan, Jones, Kelkenberg and Whitlock
Motion carried.

II. ADJOURNMENT

A motion was made by Councilmember Bomar, seconded by Councilmember Kelkenberg, to adjourn at 8:00 p.m.

All for. Motion carried unanimously.

Approved this _____ day of _____, 2016.

_____
Mayor Nancy Harris

ATTEST:

_____
City Clerk Teresa S. Lynn

KM 3/25

P.I. No. : 0013062 County: Gwinnett
Project Description: SR 13 @ CS 1181/Pleasant Hill Road

Meeting Date: June 23, 2016 **Meeting Location:** Pond & Company
Meeting Time: 2:00 p.m. 3500 Parkway Lane, Suite 600
Norcross, Ga. 30092
Meeting Purpose: Team Transition Meeting (Allatoona Conference Room)

MEETING MINUTES

Attendees: Robert Reid, GSP (RR)
Jeremy Busby, GSP (JB)
Marjorie Pozin, City of Duluth (MP)
Andrea Greco, Pond & Co. (AG)
Mark Edwards, Pond & Co. (ME)

Discussion:

Andrea provided a detailed overview of the project scope to the group including discussion of proposed Lighting, Landscaping, Walls, Etc.

Margie discussed the history of the project's inception, funding and local coordination with Mayor and Board of Commissioners.

Pond was told that a Concept Meeting was not required, but the preferred alternate was presented at a March 28, 2016 work session with the City of Duluth.

Attendees agreed that future Team Meetings could be held by conference call, unless a need truly arises for a physical meeting.

Design Traffic was reviewed by GDOT and not approved (6/22/16), but a quick turnaround for minor changes will be provided for resubmission. An exception will be requested for the major requested change of providing the + 2 years ADT & DHV for the build and no-build conditions.

The anticipated level of Environmental Document is a Programmatic Categorical Exclusion (PCE). Southeastern Engineering is doing the special studies and will be doing the GA Aster (Endangered Flower) Studies Fall 2016.

Lighting is proposed for the interchange and is identified in the concept report. A lighting Commitment is required to be included in the report.

0013062 Gwinnett Meeting Minutes
June 23, 2016

Identified Risks:

1. Railroad Coordination.
2. Billboards within project limits.
3. Getting on the Agenda for Potential Board/Work Sessions for approvals.
4. Proprietary Items.

Action Items: (With Completed Responses in Parenthesis) (Updated Items/Responses)

RR:	Send MP local let form. This will need to be included with concept report (Complete – See Attached)
RR:	Review Concept report and attachments and let Pond/Duluth know comments (Complete – Please see attached mark-ups)
RR:	Provide ME/AG/MP with proprietary items sample letter (Complete – See Attached)
RR:	Find out if $ is available remaining from PE contingency can be used for Construction funding (Complete – Office of financial Management stated that it could be moved since it was from the same pot of money.)
RR:	Ask DOT Traffic if we can waiver the additional study year requirements for this project. (Complete – Planning stated that if the consultant would provide a written agreement that they will do the +2 traffic at a later date should the project be in jeopardy of meeting the current schedule, including whatever is necessary to get approved traffic for the + 2 years including new counts and a new review, they would approve the +2 exemption.) (The waiver was requested and approved 6/29)
RR:	Follow Up on PFA
RR:	Provide Lighting Commitment examples (Complete – See attached)(Letter received and submitted to Design Policy Support)
ME/AG:	Move forward with recommendations for safety/operations based upon existing information
ME/AG:	When ready, provide MP with plans indicating work proposed for MP to submit to Railroad.
ME:	Send correspondence on previous talks with DOT and SEI regarding traffic study-additional study years (Complete)
ME/AG:	See if SEI can move CE date to within 6 months of proposed let date (Confirmed it can be delayed for submission-Complete)
MP:	Submit PFA form to GDOT
MP:	Fill out local let form from GDOT and send to Pond. (Submitted To GDOT on 7/716 – pending PFA – see Attached)
MP:	Submit Materials Testing Request Form

Attachments:

- Local Letting Approval Form (LLAF) http://www.dot.ga.gov/PartnerSmart/Local/Documents/LAPManual/LocalLetApprovalForm.pdf
- Materials Testing Request http://www.dot.ga.gov/PartnerSmart/Local/Documents/LAPManual/MaterialsTestingRequest.pdf
- Proprietary Items Request Template
- Lighting Commitment Examples
- Marked Concept Report
- Approved +2 Traffic Exemption Waiver (added)
- Signed Lighting Agreement (added)

POND

Pond & Company, Inc.

Architects
Engineers
Planners

3500 Parkway Lane
Suite 600
Norcross, GA 30092

P 678.336.7740
F 678.336.7744
www pondco.com

MEETING MINUTES

Project : **Pleasant Hill Buford Highway Interchange**
Pond Project No. : **1160240**
Meeting : Concept Review
Meeting Location : Duluth City Hall

Meeting Date : August 15, 2016

Minutes prepared by : Andrea Greco
Prepared on : August 15, 2016

Copies:

ATTENDEES:

Name	Company / Dept / Branch	Title
Margie Pozin	Duluth	City Engineer
Nick Colonna	Duluth	Director Community Development
Andrea Greco	Pond	Proj Landscape Architect
Mark Edwards	Pond	Proj Manager

PURPOSE OF MEETING : Review Concepts for Signage/Marking, Landscape and Lighting

Concept Report

- Recommend some additional changes to the Traffic Analysis language to better state the case for no at the Pleasant Hill merge/May Rd. Intersection. Mark will send his markups to SEI to have them address. We will expedite this as much as possible so that we can turn in the concept report early this week.

Lighting Plan

- The lights should be the standard Duluth lights to match what has been installed elsewhere. Coordinate with Lori at GA Power for more information on what has been installed elsewhere.
- May need to adjust spacing of lights to accommodate new light.
- For other projects GA Power has ordered and installed the lights.
- Lights may be needed to transition driver's eyes. This is fine as long as it is within the right of way. Can extend the limits of the project if necessary.
- The plan proposed was the minimal amount of recommended lighting. Pond will look at lighting the Pleasant Hill ramps and up towards May Road and beyond to see if there are any lighting needs. Further evaluate all decision points.

- There is light coming off the liquor store but those lights are not in compliance with code and will at some point be removed.

Signing and Marking Plan

- Additional changes are necessary at the interchanges at Buford Highway. It may not be feasible to move the crash barriers further towards Buford Highway. Pond will look into additional measures including extending striped median in front of the crash barrier.
- If reflectors are to be used Margie recommended looking into placing them aligned with the stripes for the Buford Highway mainline traffic so they are not disruptive to oncoming traffic that is not turning.
- Margie recommended putting painted "To 85" striping in the BH turn lane to Pleasant Hill eastbound. We may put two of these in the turn lane. Pond shows an overhead To I-85 sign in this location. If these measures are implemented we will look into removing the existing 85 directional sign on the right side.
- Margie noted that we will not be allowed to remove/replace the To Duluth/Suwanee/ Norcross sign at the north side off ramp from Pleasant Hill. However she recommended we put a To Buford Highway painted marking on the roadway near the gore at the start of the off ramp from Pleasant Hill.
- Pond will check to see if there is a Duluth ornamental directional sign to Duluth on the south side of the interchange for northbound traffic on Buford Highway to determine if we can place one at this interchange. Follow up: There was no Duluth ornamental directional sign observed south of the interchange so we will proceed with the proposed sign.
- Duluth would like us to look into the possibility of signalizing the business driveway at the northern interchange. There is an insurance business in this location that is currently not controlled by the signal. Pond will coordinate with Gwinnett County to determine options for this business. GDOT may require additional traffic data to modify this signal. Pond will confirm.

Landscape

- Margie and Nick noted that the corner landscaping at the northern intersection of Pleasant Hill and Buford Highway may not be as visible as desired because of the barrier wall.
- Pond will double check the setbacks for the roadways and adjust trees or boulders appropriately. The goal will be to make sure the existing guardrail does not need to be extended.
- Pond will make notes on the erosion control plans to clear any debris from the drainage structures within the project planting limits.
- Make sure that there is a note on the plans that the sculpture is TO BE DETERMINED and clearly state during council workshop that sculptures are for reference purposes only and are not being designed as a part of this project. May be a good idea to separate out the drawings that include the sculptures and present them at the end of the presentation.

Other Items

- To get on the August 29th work session, need to have concepts ready by the 23rd. Concepts will include a mixture of landscaping and signing & marking conceptual plans.
- Pond will make sure that an adequate contingency is included in all estimates. Margie said that bids are coming in way above the engineer's estimates on other projects at this time.
- Pond will included deductive alternates for landscape items.
- Include a $50,000 allowance for CEI during construction in the cost estimate.

- PIOH will need to be advertised in September. Pond will provide Margie with information for ad and she will coordinate with Gwinnett Daily Post. Need to make sure that at least 30 days of advance notice is given to the public.
- PIOH can be held in the City Hall Community Room.
- Margie has already reached out the railroad twice. Has received no response.
- The contingency in the cost estimate is based off this being a Safety & Operations Project. Will confirm that the correct percentage is used.

Action Items:

Duluth

- Send contact information for GA Power lighting rep to Andrea

Pond

- Send SEI comments on Traffic Analysis recommendations
- Contact the GA Power lighting rep for info
- Confirm availability on the 29th
- Talk with Chuck Bailey to get additional information about the previous studies that were done on the May Road merge area so we can use in the traffic analysis report.
- Check to see if additional traffic studies are needed for the signalization recommendations at the business driveway at the northern interchange.
- Get Margie appropriate information for the PIOH advertisement.
- Send Margie and Nick updated plans by the end of the week for final review.
- Send Margie plans for City Council by COB Monday August 22nd for City Council Workshop agenda.

.

END OF MEETING MINUTES

City of Duluth
Office of the Mayor
Nancy Harris

3167 Main Street
Duluth, GA 30096
Phone (770) 497-5321
Fax (770) 623-2765

June 30, 2016

Georgia Department of Transportation
Attn: Mr. Robert Reid, Jr.
Office of Program Delivery / Gresham, Smith & Partners
600 West Peachtree Street, Suite 610
Atlanta, GA 30308

RE: PI 0013062, Gwinnett County; SR 13 at CS 1181 / Pleasant Hill Road; Lighting Commitment Letter

Dear Mr. Reid:

The City of Duluth agrees to participate in a formal *Local Government Lighting Project Agreement* during the preliminary design phase for the above mentioned project. The cost to design and construct the lighting system is included in the 80/20 split of funding set aside for this project. The cost of operation and maintenance will be fully borne by the City of Duluth.

This indication of support is submitted and all the conditions hereby agreed to. The undersigned are duly authorized to execute this agreement.

This 29 day of June, 2016

By: _____
Nancy Harris, Mayor

Attest:

_____
Teresa S. Lyon City Clerk
Printed Name, Title